TECHNOLOGY DEPT.

Grinding and Finishing

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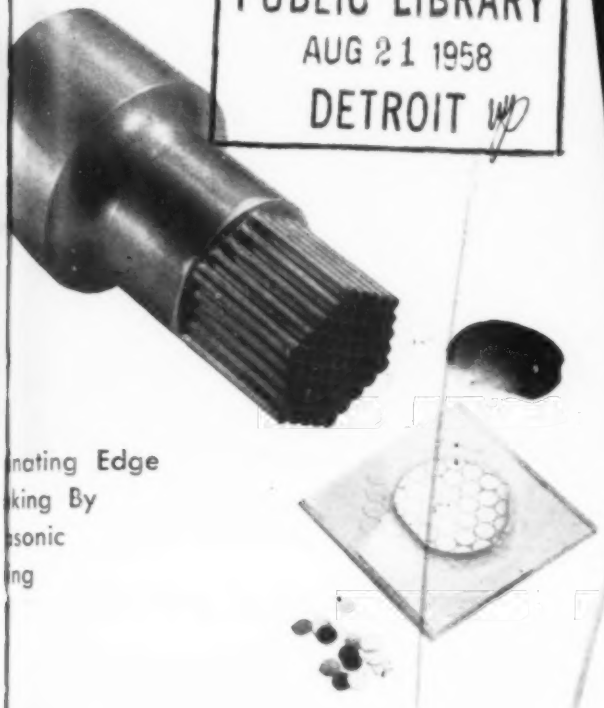

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king By
sonic
ng

Why Super-Dense Resinoid Wheels Cut Snagging Costs

The Newest in
Coated Abrasive Pro

also in this issue:

How Buick Saves Diamond Dust

Precision Blasting Process Speeds Removal of Organic Coatings from Potentiometer Windings

Shop Hints and Kinks

itchcock publication

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Full Diamond Content of NORTON Diamond Wheels
Each NORTON 100 concentration diamond wheel contains an amount of diamond in carats calculated to a formula of 72 carats per cubic inch. Wheels of 75, 50 and 25 concentration of diamond contain 75%, 50% and 25% of this 100 concentration standard respectively.
The finished wheel actually contains the calculated number of carats of diamond except for the slight loss resulting from truing the diamond section to place the wheel in proper truth and condition for grinding.
Norton Company guarantees that every NORTON diamond wheel is made in accordance with this standard.
PRESIDENT
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It guarantees the full diamond content of the wheel . . . assures complete dependability of the diamond concentration mark on the wheel itself . . . and bears the signature of the President of Norton Company.

You get this certified protection with every Norton diamond wheel you buy.

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NORTON
ABRASIVES

Making better products . . . to make your products better

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... wherever abrasive operations are performed

grinding and finishing

Contents • August, 1958

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BPA

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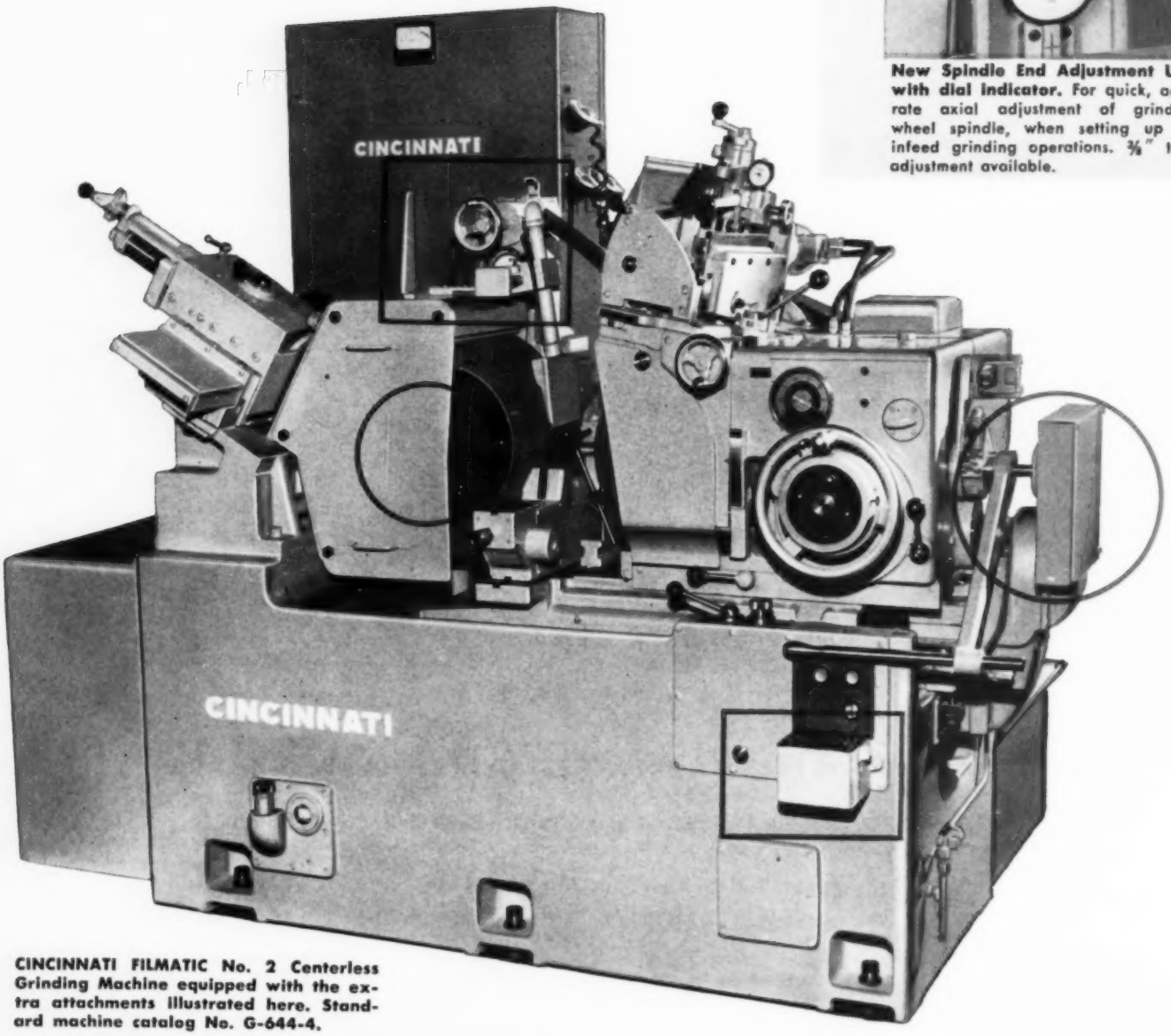
LOOK WHAT'S NEW

New Spindle End Adjustment Unit with dial indicator. For quick, accurate axial adjustment of grinding wheel spindle, when setting up for infeed grinding operations. 3/8" total adjustment available.

FILMATIC



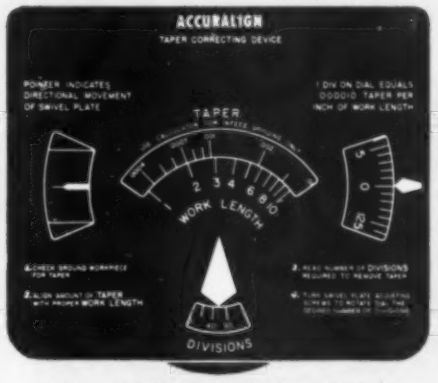
CINCINNATI FILMATIC No. 2 Centerless Grinding Machine equipped with the extra attachments illustrated here. Standard machine catalog No. G-644-4.

CINCINNATI®

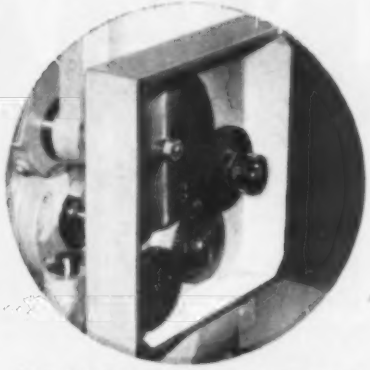
CENTERTYPE GRINDING MACHINES • CENTERLESS GRINDING MACHINES
ROLL GRINDING MACHINES • SURFACE GRINDING MACHINES CHUCKING

in Low-Cost Centerless Grinding

Automatic Grinding Wheel Balancing . . . an exclusive feature. Freely rotating steel balls automatically balance the wheel mount when unclamped. Perfect balance is attained in a few seconds. Ask for demonstration.



New Precision Indicator Attachment for taper correction. Provides a visual check on the amount of regulating wheel unit swivel adjustment, measured in increments of .000010" per inch. Top of unit shown here.



New Vari-Pitch Unit for hand infeed grinding. A simple change gear arrangement gives the operator a choice of three throat openings for maximum safety and convenience in loading infeed work.

. . . New Types of Equipment now available for CINCINNATI FILMATIC Nos. 2 and 3

In centerless grinding, the newest is CINCINNATI, and every new feature contributes to the end result of reducing precision grinding costs. Just take a look at the new accessory equipment illustrated here. It's easy to see how useful these attachments are in saving setup time; improving quality; facilitating operation . . . in short, *reducing costs*. Other equipment in which you will be interested includes:

New Crush Truing Unit for production form grinding. Incorporates several exclusive features. (Separate literature available, No. G-706.)

New Bar Grinding Fixtures: type "V" for bars 3, 6 and 9 ft. long; "C" for bars up to 24 ft. long.

New Work Blade Dial Indicator for quickly and accurately aligning work rest blade.

Push-Button Automatic Grinding Wheel Truing.

Automatic Gap Eliminator (with Automatic Electro-Hydraulic Infeed) for production infeed work: greatly reduces time spent in "grinding air."

In addition to the many advantages offered by these new CINCINNATI Centerless Attachments, the machine itself will give you far superior performance because of FILMATIC grinding wheel spindle bearings . . . antifriction infeed slide . . . infinitely variable regulating wheel speeds . . . quality controlled castings. Cincinnati is tops for your replacement program; for producing your new products; for engineering service. Preliminary information in Sweet's Machine Tool File.

CINCINNATI

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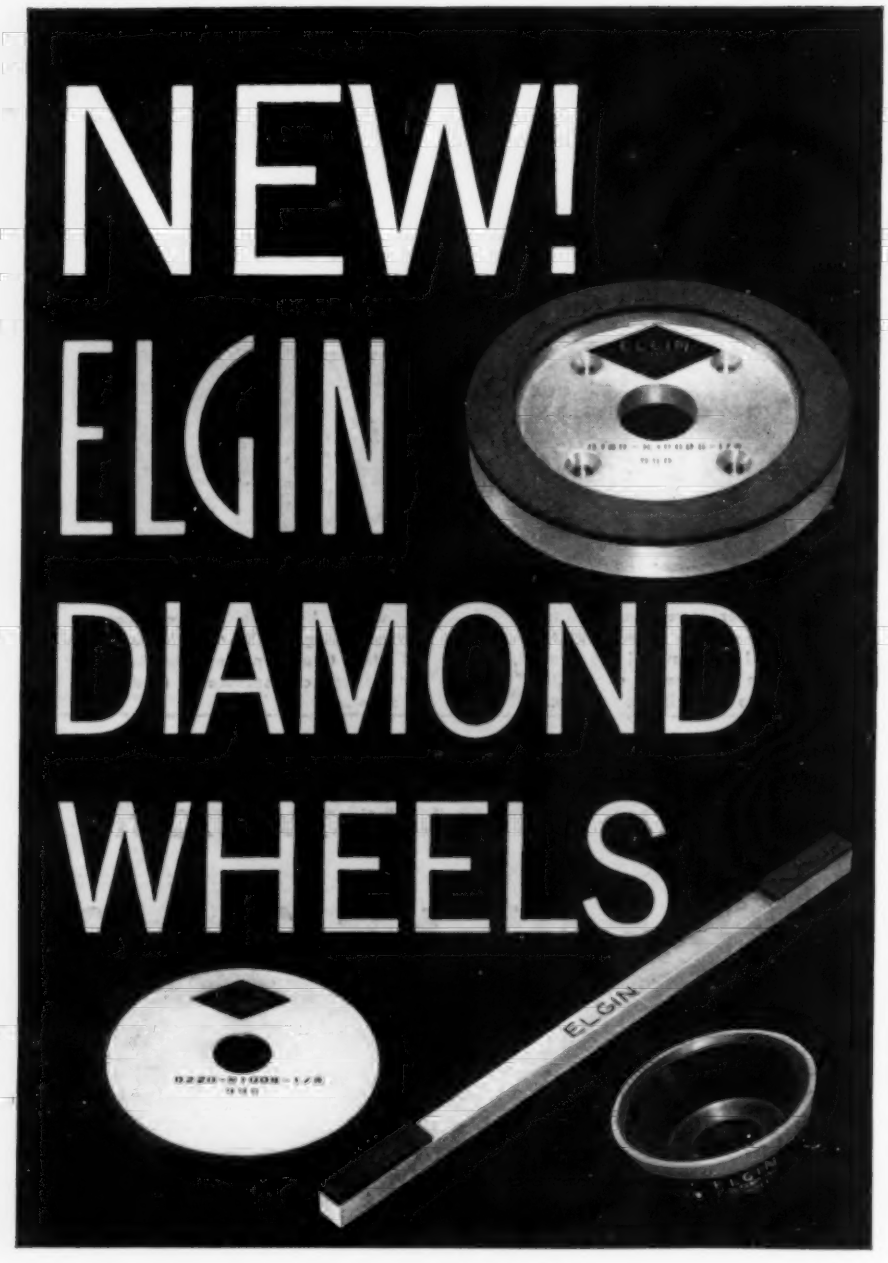
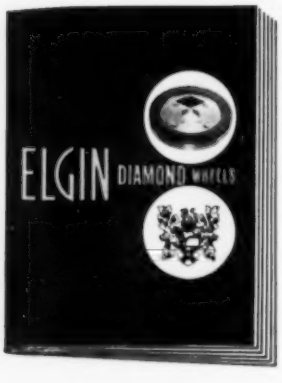
CHUCKING GRINDERS • CENTERLESS LAPPING MACHINES

Grinding Machine Division
THE CINCINNATI MILLING MACHINE CO.
CINCINNATI 9, OHIO





Now – ELGIN offers you a complete line of Golden Circle Diamond Wheels with *guaranteed diamond content*

Diamond wheels—every shape, every size—resinoid, metal, or vitrified bonded—they're all available from Elgin! Guaranteed diamond content means more pieces ground per wheel, more return on your wheel-dollar. Consult an Elgin field engineer—his broad abrasives experience will help you select the right grit, wheel-shape, and bond—the wheel that will keep your grinding costs down. Our new diamond wheel catalog greatly simplifies ordering. Write for it today.

Abrasives Division
ELGIN NATIONAL WATCH COMPANY
ELGIN, ILLINOIS

Letters to the Editor

Flat-Type Coated Abrasive Wheels

We are interested in the flap-type abrasive coating wheels, the 48" face wheel design for polishing broad surfaces, and grits which deliver a finer finish, which appeared in an article in June.

We are very much interested in this operation and would like for you to give us the names of manufacturers who manufacture these large rollers. We would like to polish 100,000 lbs. of stainless steel per month. We are wondering about the practicability of it as to cost. Any information would be appreciated.

Leon Duncan
Zero Manufacturing Co., Inc.
Washington, Mo.

Methods of Cleaning Coolant

We have read with great interest the first two installments of the paper on "The Cleaning of Grinding and Finishing Coolants."

We also note that reprints of the whole series will become available shortly, and we would be grateful if you would forward two copies for the attention of the undersigned.

W. J. Saunders
Canadian SKF Co., Ltd.
Scarboro, Ont., Can.

We are confirming our telegram of today's date requesting that you reserve 75 copies on "The Cleaning of Grinding and Finishing Coolants."

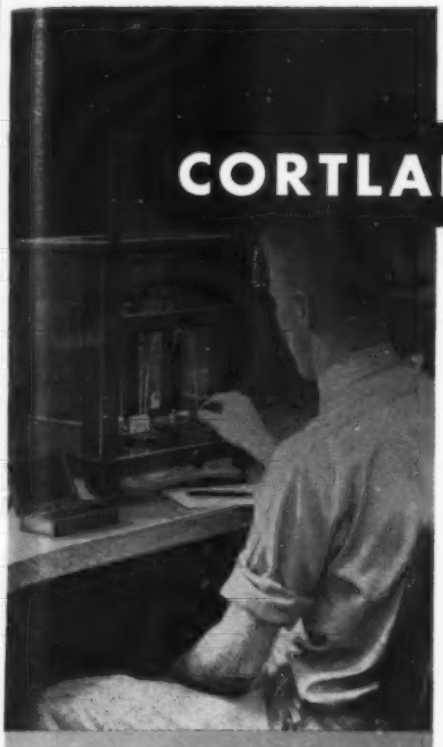
Thank you for your kind remarks and we look forward to receiving the articles.

Samuel Alsop, Pres.
Alsop Engineering Corp.
Milldale, Conn.

Our attention was recently directed to a four-part article by Arthur L. Wilson entitled "Recommended Methods of Cleaning Coolant on Grinding and Finishing Machines." We would like to have a copy of this complete article if it can be made available to us.

H. E. Hylbak
Construction Engineering Operation
General Electric Co.
Richland, Wash.

CORTLAND TOOL ROOM WHEELS-



by craftsmen . . . for craftsmen

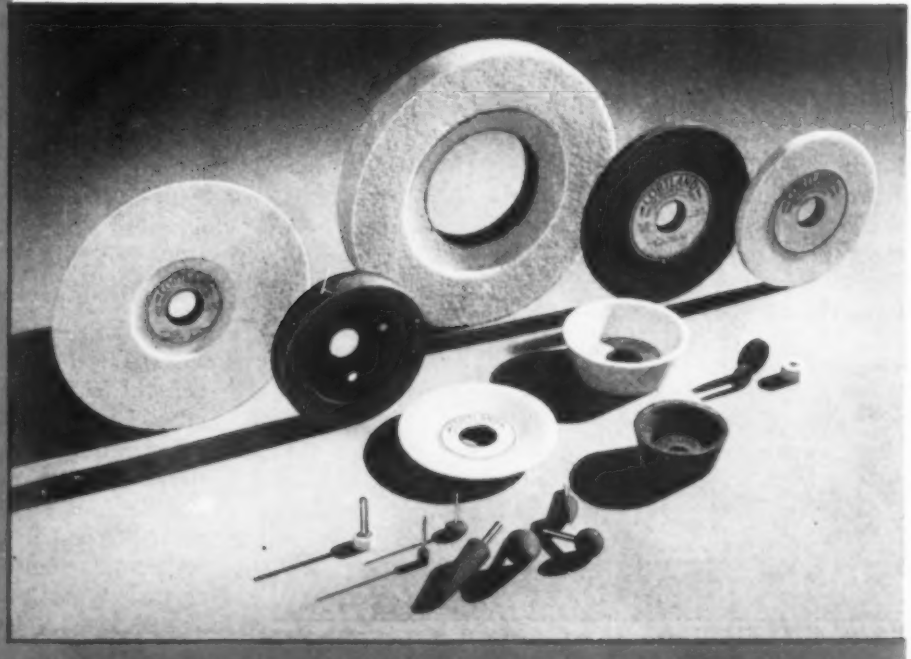
The rigid requirements of tool room operations are readily met with Cortland Tool Room Wheels.

This is true — basically — because we ourselves insist on only the highest quality materials. We have the knowledge and experience necessary to process these ingredients to the precisely correct grain, grade and structure combinations.

And we have all the equipment and facilities to produce — consistently — products that brook no compromise with highest quality standards.

Quality Insurance

This man is seeing to it that your plant produces the best grinding work that's possible for an abrasive wheel to give. Constant quality checks are a part of every step of manufacture here at Cortland . . . your assurance of high quality all down the line.



CORTLAND

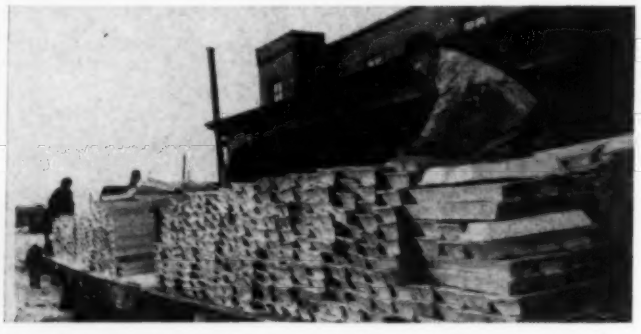
CORTLAND GRINDING WHEELS CORPORATION
Chester, Massachusetts

. . . wherever abrasive operations are performed

Grinding and Finishing Around the Country

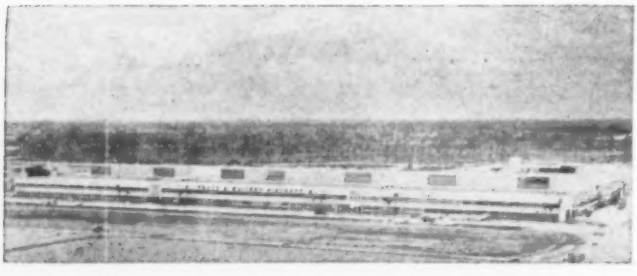
Russia's Aluminum Production A Threat to U.S. Industry

Soviet aluminum, offered at prices to beat the free world producers, has helped put a damper on the American and Canadian aluminum market. An article, entitled "The Threat of Red Aluminum," scheduled



Loading aluminum pigs on a railway flatcar at a Russian aluminum works in the Kemerovo region of Siberia.

for the July-August 1958 issue of *Reynolds* (Reynolds Metals Co.) *Review*, goes on to say that Russia claims to possess extensive deposits of aluminum ore. After hording large amounts of the light metal, in 1955 Russian aluminum began to flood the international market in large amounts. No longer needing an overstock of a large and growing aluminum production, Russia has used this as a weapon of economic warfare. The United States must plan for a counterattack.



Pratt & Whitney Aircraft's Florida Research and Development Center, located in the Upper Everglades, was formally dedicated May 27. The new facility has a total of 650,000 sq. ft. and includes laboratories, experimental machine shop, engine assembly area, test cells, administration offices, cafeteria and dispensary. At the dedication, exhibits depicting the major achievements of P&W Aircraft since 1925 were on display. For the first time, the highly advanced J-58 gas turbine was shown publicly. •

Rhode Island Industry Ignores Recession

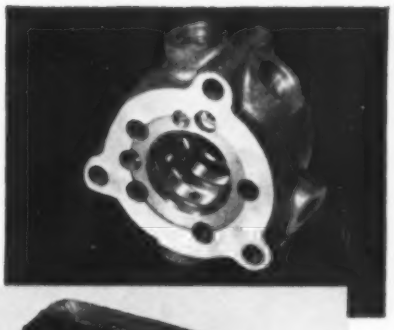
Abrasive Machine Tool Co. was the first plant to host a new series of "Come See What's Right with Rhode Island Industry" meetings sponsored by the Rhode Island Tool and Die Manufacturers Association. They believe that "recession" is caused by a state of mind. An opportunity was given industrialists to see what firms are doing to boost sales, swell employment and gain bigger market shares. Abrasive's recently-introduced automatic cycling equipment for new Hydrabrasive precision surface grinders was used to show progress in the machine tool field. •

Beryllium Used Without Hazarding Health

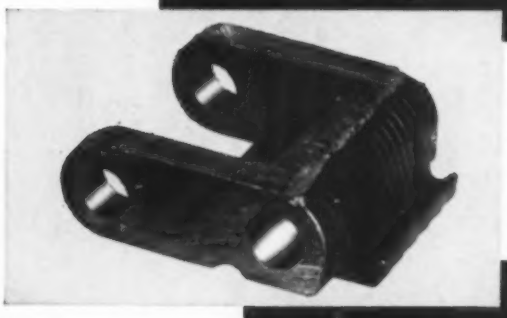
In a paper delivered at the semi-annual meeting of The American Society of Mechanical Engineers, Donald R. Walker, of the Avco Manufacturing Corporation of Massachusetts, described work done by his organization to find safe ways to machine beryllium. Beryllium's potential usefulness stems from its high melting point of over 2300° F. and properties that make it more elastic than steel and stronger, pound for pound, than titanium. Its disadvantages he named as toxicity to humans, brittleness, and its high price as compared to other metals.

Special precautions taken include a "vacuum-cleaner" type of device to collect chips and dust. The chips can later be collected and sold as scrap, thereby helping to keep costs down.

The principal uses for beryllium now are in the atomic energy field and as an alloying element for copper. •



CONTROL VALVE
MAT: Cast Iron
DIA: 1.625"
TOL: .00025"
STOCK: .0015"
PROD: 40/HR

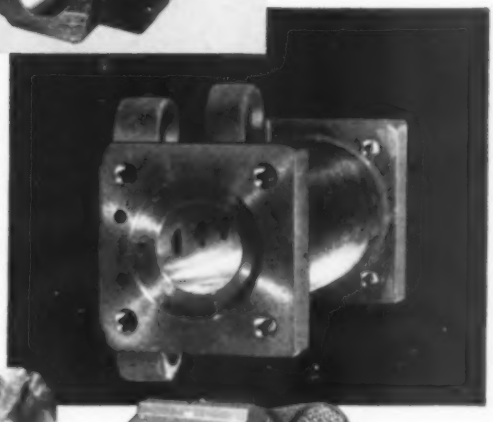


CIRCUIT BREAKER LATCH
MAT: Lam. Steel 60 Rc
DIA: .500"
TOL: .0005"
STOCK: .0015"
PROD: 45/HR

Bore-Sizing Problems? Limited Budget?

...solve *BOTH* with

SUNNEN® HONING



CONTROL VALVE BODY
MAT: Cast Bronze
DIA: 1.000"
TOL: .0001"
STOCK: .003"
PROD: 16/HR

You may be reluctant to make a large capital investment at this time, in spite of a pressing need to break production bottlenecks.

However, there's no need to wait! You can solve your problems with a Sunnen Honing Machine NOW . . . without tying up your operating capital.

Average cost of a Sunnen Honing Machine with tooling runs about $1,000.

These versatile, low-cost machines are guaranteed to hold .0001" accuracy, with controlled surface finishes as fine as 2 microinches. And—they can outproduce internal grinders . . . especially on small work. Range: ⅛" to 2⅝".

Many manufacturers have bought these universal machines to keep initial investment and cost per piece low.

One of our field engineers will be glad to demonstrate a machine in your plant, on your parts, without obligation.

7937

WRITE US FOR MORE INFORMATION NOW
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SUNNEN® PRODUCTS COMPANY
HONING

7921-I Manchester Ave. • St. Louis 17, Mo.
Canadian Factory: Chatham, Ontario

AVAILABLE WITH FROM ONE TO SIX OR MORE GRINDING HEADS

CAPACITIES:

6" x 96" Belt:
5½" max. width and
6½" max. thickness

9" x 96" Belt:
8½" max. width and
6½" max. thickness

12" x 96" Belt:
11½" max. width and
6½" max. thickness

OPTIONAL FEATURES:

Electro-Magnetic chucks
Powered elevation of grinding heads
Built-in coolant filtration system

From the leaders in the industry . . .

The new Series 96 Heavy Duty abrasive belt machines are built to deliver toolroom precision in continuous production runs.

High speed multiple grinding and finishing operations are performed in the same time required for a single operation. Rapid, exceptionally heavy stock removal permits unmachined surfaces to be ground to fine finishes and exacting tolerances in one continuous pass.

Heavier construction and solid, one-piece work table enable Series 96 machines to maintain tolerance standards of ± .0005 on flat finishing, with stock removal up to 1/32" per head on ferrous material.

Conveyorized feed is adjustable, ranging from 0' to 67' per minute. Both conveyor and abrasive belts feature pneumatic tensioning.

Rapid-traverse grinding heads are equipped with #50-taper hardened precision ground spindles, with super-precision taper roller bearings.

Representing the peak of development in abrasive belt machines, Series 96 take their place beside the finest of machine tools for speed, precision, reliability and cost reduction.

Write today for free catalog sheet containing complete information and specifications on the Engelberg Series 96 abrasive belt machines.

ENGELBERG, INC.

Precision **ABRASIVE BELT GRINDERS**

328 SENECA STREET • SYRACUSE, N. Y.

Grinding and Finishing Around The Country . . .

Business Should Re-Examine Its Job Training Program

Ralph G. Smith, of the Dow Chemical Co., speaking at the ASME meeting, called management shortsighted for eliminating on and off-the-job training in order to cut plant costs as soon as profits begin to fall. In the past seven years, he said, there has been a 28% drop in the number of craftsmen under the age of 25. An adequate training program should be built up, making use of men in the prime working age bracket of 25-44. •

Bendix Expands Facilities

A new plant expansion, that will provide a 14% increase in floor space for manufacturing filters for aircraft, missiles, industrial and ground support equipment, will be made at the Bendix Filter Division (Bendix Aviation Corp.) main plant at 434 W. 12 Mile Rd., Madison Heights, Mich. The reason for the expansion is the increasing demand by the aircraft and missile industry for high performance, shock and vibration resistant filters operating in the higher temperature ranges. •

Operator is shown loading the Model TF, 6-spindle bar Conomatic with Jones & Laughlin Steel Corporation Type A, 13/16" cold finished leaded-steel hexagon bars from which spark plug shells are being machined. This is the first item selected in the Comapro project, the purpose of which is to determine the most efficient production procedures and to demonstrate how machine shop costs can be reduced. J & L is participating in the project which was initiated by the Cone Automatic Machine Co., Windsor, Vt. •

Deburring and Cleaning

8 TIMES FASTER — and Better

by Liquid Honing with EXOLON FASTBLAST

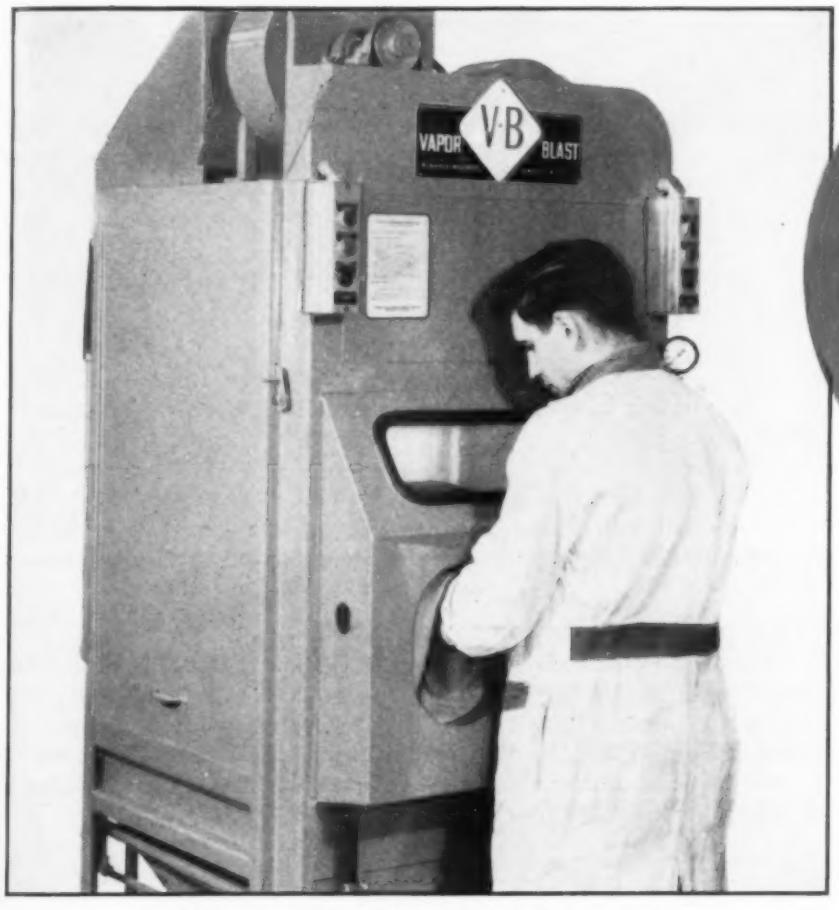
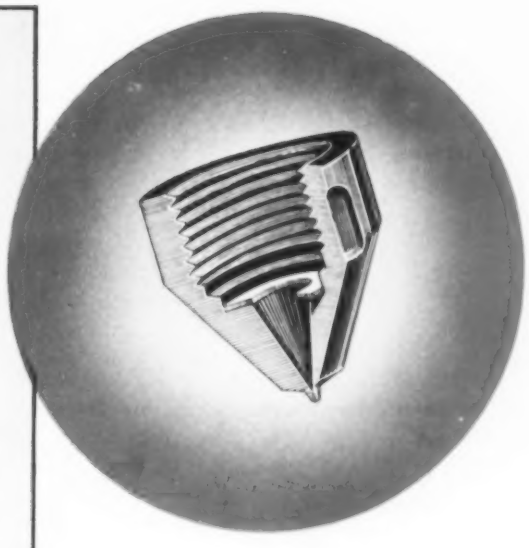


Photo courtesy Vapor Blast Mfg. Co., Milwaukee, Wisconsin.



The almost microscopic holes in this Diesel fuel injector cup were deburred and cleaned by Liquid Honing with EXOLON FASTBLAST. And, best of all, it produced a smooth surface that promoted better fuel flow and cut down gum deposits — all at a saving of 87.5% over conventional methods.

If you have a finishing operation, let our technical and research staff estimate your savings by changing to this profit making method! Mail coupon below for fast service!

Liquid Honing is a method using EXOLON FASTBLAST (aluminum oxide) abrasive in particles so small they can be suspended in a slurry and thrown at high speed against the work to be finished. Scales, burrs, carbons, oxides are quickly removed — in fact one man and one machine equalled the former production of eight men using conventional methods in the deburring and cleaning of the Diesel fuel injector cup illustrated.

The rate of finish is controlled by varying the air pressure, abrasive size, type and concentration, blast angle and distance of nozzle from the work. The abrasive mesh sizes are usually 80, 100, 150, 180, 220, 240, 320, 400 and 600.

The EXOLON Company
TONAWANDA, N. Y.

We are interested in saving money on our finishing.

- ☐ Have an EXOLON representative call on us.
- ☐ Send us information on EXOLON FASTBLAST.
- ☐ Send us information on "Liquid Honing".
- ☐

Name _____

Company _____

Address _____

City _____ Zone _____ State _____

The EXOLON Company

1002 East Niagara Street • Tonawanda, N. Y.
Thorold, Ontario, Canada

Manufacturers of SILICON CARBIDE *and* ALUMINUM OXIDE ABRASIVES

. . . wherever abrasive operations are performed

News of Metalworking

Russian Automation Facilities May Surpass Ours

DETROIT: Russian automation facilities and techniques may be superior to those of the United States unless a new emphasis is placed on building automatic factories in this country, said Nevin L. Bean of the Ford Motor Co., in an address before The American Society of Mechanical Engineers in Detroit. Although Russian plants are not now as productive, as well-organized, well-lighted or as clean as those in this country, many of these conditions are being changed rapidly, he said. •

Realistic Depreciation Policy Needed

RICHMOND, IND.: The National Automatic Tool Co., Inc. declared that if American industry wants to compete successfully, both here and abroad, "we must find a way to replace capital in full as it is consumed. The right way to do this is through a realistic depreciation policy." Natco pointed out that "for tax purposes under present laws, we are only permitted to depreciate assets on the basis of original-cost dollars, without conversion to current dollars—the kind we are receiving from customers." This situation, the firm charged, led to national "understatement of depreciation" last year amounting to about $6 billion. •

Financing Major Factor in Machinery Sales

NEW YORK: According to Thomas E. Lenihan, President of C.I.T. Corporation, industrial financing firm, "Installment financing is no longer simply a credit device but, rather, a prime selling method that has gained wide favor in fields as diverse as packaging, road building and materials handling." The firm has long-term financing plans, some as long as ten years, working for manufacturers and dealers of machinery in more than ninety different fields. •

Timken to Spend $51 Million in Five Years

CANTON, OHIO: An investment of $51,000,000 in new equipment and facilities covering the next five years is being planned by The Timken Roller Bearing Co. Already more than $3 million dollars worth of new grinding and finishing equipment has been ordered for installation in the Canton, Columbus and Bucyrus plants. The steel and Tube Division will spend $13 million during 1958 on equipment. •

Steel Demand To Grow

PROVIDENCE: Lukens Steel Co. looks for over-all steel demand to strengthen by the fourth quarter of this year, and for steel plate producers to enter 1959 on a rising trend in the capital goods industry. "Inventory liquidation has been heavy. Consumption of steel in the first quarter was at a rate of about 1-million tons per month above the quantity being produced," Wiese, Vice-President-Commercial, said before a meeting of the Providence Society of Financial Analysts. "However, by the fourth quarter we expect demand to strengthen." •

Aluminum Alloy 2618 Available

CHICAGO: Availability of aluminum alloy 2618, designed especially for use in higher temperature applications ranging up to about 500 degrees F. is announced by Kaiser Aluminum & Chemical Sales, Inc. Originally developed for aircraft engine parts, the alloy is being produced by Kaiser under a license agreement with High Duty Alloys, Ltd., of Great Britain. It is available in sheet, plate, extrusions, hand or die forgings and forging stock. •

MURRAY WAY announces...

a practical, new idea in add-as-you-need-it, low cost, unitized, automatic polishing and buffing equipment!

IT PAYS FOR ITSELF!

- LOW CAPITAL OUTLAY.
- EXPANDS INEXPENSIVELY TO YOUR NEEDS.
- DOUBLES OR TRIPLES PRODUCTION.
- IMPROVES QUALITY—CUTS COST.
- REQUIRES ONLY 6′x8′ FLOOR AREA.
- ADJUSTABLE, AUTOMATIC OPERATION.

Murray-Way's years of specialized experience in automatic polishing and buffing equipment are at your service. The Junior Automatic is only one item in our line of standardized equipment for specialized applications. We invite your inquiries and special equipment problems.

Write today for detailed literature and prices.

A small automatic with "big" abilities. The Murray-Way Junior Automatic is designed to economically handle a few pieces or a large production. It's ideal for big or small plants.

Available with basic equipment at a fraction of the cost of conventional automatic or semi-automatic buffing and polishing machines, the Junior Automatic can be equipped with standardized additional units, as-you-need-it, to handle practically any job in the place.

Adjustable heads available with vertical, horizontal and angle wheels or abrasive belts. Adjustable cycle and dwell. Automatic wheel lift-off and other features usually available only on bulky, expensive automatics.

MURRAY WAY CORPORATION

P. O. BOX 180, MAPLE ROAD E. - BIRMINGHAM, MICH.

DALZEN

2 in 1 COMBINATION
CENTER GRINDER AND DRILL PRESS

A drill press and center lapping machine at less than the cost of many single purpose center grinders! In addition to savings on equipment costs, the Dalzen "2 in 1" permits maximum man-hour production thereby keeping your unit cost at a minimum!

1 SIMPLE OPERATION CHANGES CENTER GRINDER TO DRILL PRESS

Center grinder to drill press or drill press to center grinder in a matter of seconds! Simply unlock clamping handle and swing diamond dresser in or out of position! Photo at left shows center grinder in dressing position. Photo above shows center grinder at work.

A full 43" capacity from base to spindle . . . dresser adjustment from 20° to 100° included angle . . . drills to center of 15" circle . . . maximum lapping stone dia. 3".

THREAD GRINDER

Average Set-Up Time 30 Minutes!

Saves Floor Space! Low Cost!

Excellent for tool room and production Thread Grinding. Easily set-up from job to job! Has built-in relieving attachment as standard equipment for grinding of taps. This remarkable machine may also be used to grind angles, grooves and surfaces where concentricity is an important factor!

Dresser and wheel head are self-compensating. Size of work is automatically maintained after dressing of wheel regardless of how much is dressed off.

The grinding and regrinding of thread rolls up to 3" in diameter and thread milling cutters can also be ground with special attachment.

WE ALSO SPECIALIZE IN
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Harley C. Lee Awarded Ohio U Medal

CLEVELAND: The Benjamin G. Lamme Medal of Ohio State University—one of that institution's highest honors—was awarded to Harley C. Lee, Vice-President and Director of Basic, Inc. The gold medal is awarded each year to an alumnus of Ohio State in recognition of "meritorious achievement in engineering or the technical arts." •

Bendix-Pacific Making Systems for 20 Missiles

NORTH HOLLYWOOD: Production of components and systems for 20 United States missiles will account for more than half of the 1958 sales at the Pacific Div. of Bendix Aviation Corp., General Manager R. C. Fuller announced. Work on the missile projects will make up 54.4% of the division's sales during this year. •

Du Pont to Manufacture A New Grade of Silicon

WILMINGTON: A license agreement for the Du Pont Co. to manufacture and sell a new grade of ultra-high-purity silicon under a process developed by the International Telephone and Telegraph Corp. has been signed.

The new grade of silicon will meet a need in the electronics industry for material of exceptional purity to be used in the manufacture of such components as high-voltage rectifiers and power transistors. •

Reinforced Plastics 10% Ahead of Last Year

NEW YORK: By the year's end the total sales of reinforced plastics may run more than 10% ahead of the 168 million pounds sold in 1957, it was announced by the Reinforced Plastics Division of The Society of the Plastics Industry, Inc. A. W. Levenhagen, President of Molded Fiber Glass Tray Co., Linesville, Pa., was installed as General Chairman for the coming year. •

Metal removal *faster* at lower cost

CHICAGO MOUNTED WHEELS

Prompt Out-of-Stock Deliveries

There is a precision-engineered Chicago Mounted Wheel or point for every imaginable grinding operation. Ideal for efficient, effective deburring. . . . Always available . . . in all standard sizes, and over 200 special shapes, for out-of-stock delivery. Save Time – Money – Materials . . . Specify Chicago Mounted Wheels!

Every Chicago Mounted Wheel is produced under positive production control . . . assuring perfect uniformity of mounted wheels and points. There is no variation from one production run to another.

Positive density control for peak job performance

Guaranteed to stay on the mandrel . . . perfectly balanced

Chicago Mounted Wheels are easily dressed and hold their shape

Unlimited number of combinations of dimension, shape, grain, size and bond

WRITE FOR *Trial* CHICAGO WHEELS

Test them yourself!

Send coupon for two Chicago Mounted Wheels . . . Test one against the other . . . you'll see the meaning of true uniform performance!

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Send me two sample Chicago Mounted Wheels without charge:

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City ..... Zone ..... State .....

For information about any advertised product, see the Advertisers Index and Action Card inside back cover

Letter From Washington

By **D. M. Carlson** . . . . August, 1958

Business appears to be out of danger. Inspiriting recuperation is predicted for remainder of year.

●Steady business gains (attributed to state and local spending, increased auto sales, and a continued rise in construction) have been predicted for the remainder of 1958. A decline in business' capital outlays between the second and fourth quarters will be more than offset by a $3 billion jump in Federal spending. Pressures such as the coming election, the unemployment problem, and international events have combined to block the Government's attempt to keep this rise to a minimum.

Small business tax relief makes tentative gains in Ways and Means Committee.

●The Ways and Means Committee is still working on tax relief for small business. No official announcement of their decisions has been made, but it is believed that three reforms have been tentatively approved: (1) Shareholders of a small business enterprise could, if they chose, figure their tax on a partnership basis. (2) Investors in small business stock would be permitted to claim an ordinary loss deduction rather than a capital loss. (3) Heirs of small business property could take up to ten years to pay estate taxes. Sanction of a stepped-up depreciation program is unlikely, but several substitute plans are being considered by the Committee.

One out of eight employed persons is a government civilian worker. Payrolls reach $30 billion annually.

●Payrolls covering approximately eight million government civilian workers are nudging $30 billion a year, Tax Foundation, Inc., reports. Adding to this the $10 billion military payroll, government wages reach the staggering sum of $40 billion a year. One out of every eight employed persons in the United States is a Federal, state, or local government civilian worker. By most recent count, about 5.5 million are on state-local payrolls and some 2.3 million are on the rolls of the Federal government's Executive Branch. The Federal civilian payrolls amount to $11 billion annually and the state-local payrolls about $19 billion. Recently approved wage increases to military, postal and classified workers are expected to cost taxpayers an additional $1.4 billion annually. Of this, postal workers will receive $265 million, members of the armed forces (active, reserve, and retired), $576 million, and classified workers, $547 million.

Norwegian reactor will cost U.S. taxpayers $350,000.

●An aggregate of 350,000 American tax dollars will be contributed toward the cost of a nuclear research reactor project being undertaken by the Institute for Atomenergy, an agency designated by the Norwegian government for research and development in nuclear energy. This is the sixteenth grant to be made as a result of President Eisenhower's Atoms-For-Peace offer in June, 1955, to assist foreign countries in the acquisition of nuclear reactors. The funds are made available to the Atomic Energy Commission by the U.S. International Cooperation Administration from Mutual Security Program funds and will be transferred to the Government of Norway upon completion of the project, scheduled for the summer of 1960.

What of Ancient Prophecies—Are They Being Fulfilled Now in the Middle East?

As cataclysmic event follows cataclysmic event in the Middle East, we are forcefully—even fearfully—reminded of scriptural prophecies concerning conditions in Israel during what is repeatedly referred to as the "last days."

Consider, for example, the words from the pen of the Prophet Zechariah in the Old Testament book bearing his name (this quotation is found in the twelfth chapter continuing with the fourteenth chapter).

"The word of the Lord concerning Israel: Thus says the Lord, who stretched out the heavens and founded the earth and formed the spirit of man within him: 'Lo I am about to make Jerusalem a cup of reeling to all the peoples round about; it will be against Judah also in the siege against Jerusalem. On that day I will make Jerusalem a heavy stone for all the peoples; all who lift it shall grievously hurt themselves. And all the nations of the earth will come together against it . . . And on that day I will seek to destroy all the nations that come against Jerusalem.'

. . . . . .

"And this shall be the plague with which the Lord will smite all the peoples that wage war against Jerusalem: their flesh shall rot while they are still on their feet, their eyes shall rot in their sockets, and their tongues shall rot in their mouths. And on that day a great panic from the Lord shall fall on them, so that each will lay hold on the hand of his fellow, and the hand of the one will be raised against the hand of the other; even Judah will fight against Jerusalem. And the wealth of all the nations round about shall be collected, gold, silver, and garments in great abundance. And a plague like this plague shall fall on the horses, the mules, the camels, the asses, and whatever beasts may be in those camps.

"Then every one that survives of all the nations that have come against Jerusalem shall go up year after year to worship the King, the Lord of hosts, and to keep the feast of booths. And if any of the families of the earth do not go to Jerusalem to worship the King, the Lord of hosts, there will be no rain upon them."

Social Security Protects Against Political, Social, and Economic Instability, Says Chamber

In the manner that compulsory education protects the body politic from the bad judgments of illiteracy, says the U.S. Chamber of Commerce, the basic purpose of compulsory Social Security is to protect society from the political consequences of leaving millions of elderly persons with no visible means of support.

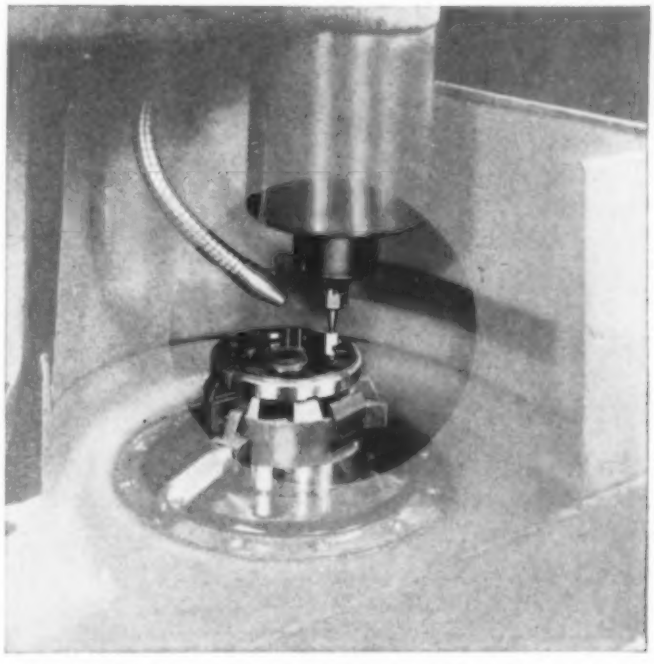
"If our worthy, growing, experienced, and resourceful older population were left completely adrift in today's economic tides, we could expect them to take a kind of concerted action that could easily lead to political, social, and economic instability," the Chamber warns.

Basically, the purpose of Social Security is to provide a floor of protection against destitution in old age. It was never intended to meet *all* the economic needs of elderly persons.

HOLES

JIG GROUND with

Vulcanaire



VULCANAIRE AIR MOTOR ON PRODUCTION

Production cams with eight slots to be ground to tenths of thousandths. A special machine was used for indexing and oscillating. The Vulcanaire holds up under severe production schedules. Production ground parts to close tolerances! Another satisfied customer.

Provide yourself with this inexpensive instrument for use on your present equipment and JIG GRIND with a guarantee.

{ Borrow our instructive 11 minute movie on Jig Grinding. }

SERVICES OF YOUR TOOL ROOM IN DAYTON
ENGINEERING • PROCESSING • BUILDING • TOOLS
DIES • SPECIAL MACHINES • VULCANAIRE JIG
GRINDERS • MOTORIZED ROTARY TABLES • BREHM
"SHIMMY" AND RELATED DIES • AUTOMATION

Vulcan's 41st Year

VULCAN TOOL COMPANY
743 Lorain Ave., Dayton 10, Ohio

VULCAN tools

Mr. Paul Jones (center), Director of Public Information, National Safety Council, is shown presenting their 1957 "Public Interest" Awards to Morrey Patterson (left) Managing Editor, Grinding and Finishing and Dick Bush (right) Managing Editor of Hitchcock's Mass Transportation—School Bus Trends. This award for "exceptional editorial service to safety" has been awarded to these Hitchcock publications for consecutive years.

THE MEN FROM HITCHCOCK

"Editorial service and superiority" has earned recognition and awards of many types for the various Hitchcock publications. The editors are proud, indeed to receive awards like the ones pictured above . . . for the 1957 "Public Interest" Awards are presented only to media performing an outstanding service to safety . . . a topic that is of the utmost importance to readers of these Hitchcock publications.

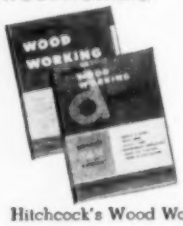
Cover to cover readership . . . this too, is an award of "merit" from our readers . . . in fact, it is this "readership award" that means the most to our advertisers. This consistent, cover to cover readership insures you, as an advertiser, that your sales-message will be read by the "prime prospects" in your market at a time when they are most receptive to new ideas, methods and products. Naturally, the recognition that pleases us most is the award of "confidence" received from the hundreds of advertising agencies and advertisers that select Hitchcock publications to carry their sales-messages. Best of all, this award has proven to be reciprocal . . . for advertisers have learned that advertising in Hitchcock publications "pays-off" in consistent, solid, business building results.

If you sell to the Metalworking, Woodworking or Public Passenger Transportation markets, it will pay you to talk to your "Man from Hitchcock" soon. Let him explain how Hitchcock publications will play a major role in assuring success in your over-all marketing plans.

METALWORKING

Machine & Tool Blue Book
Machine & Tool Directory
Grinding and Finishing
Carbide Engineering

WOODWORKING



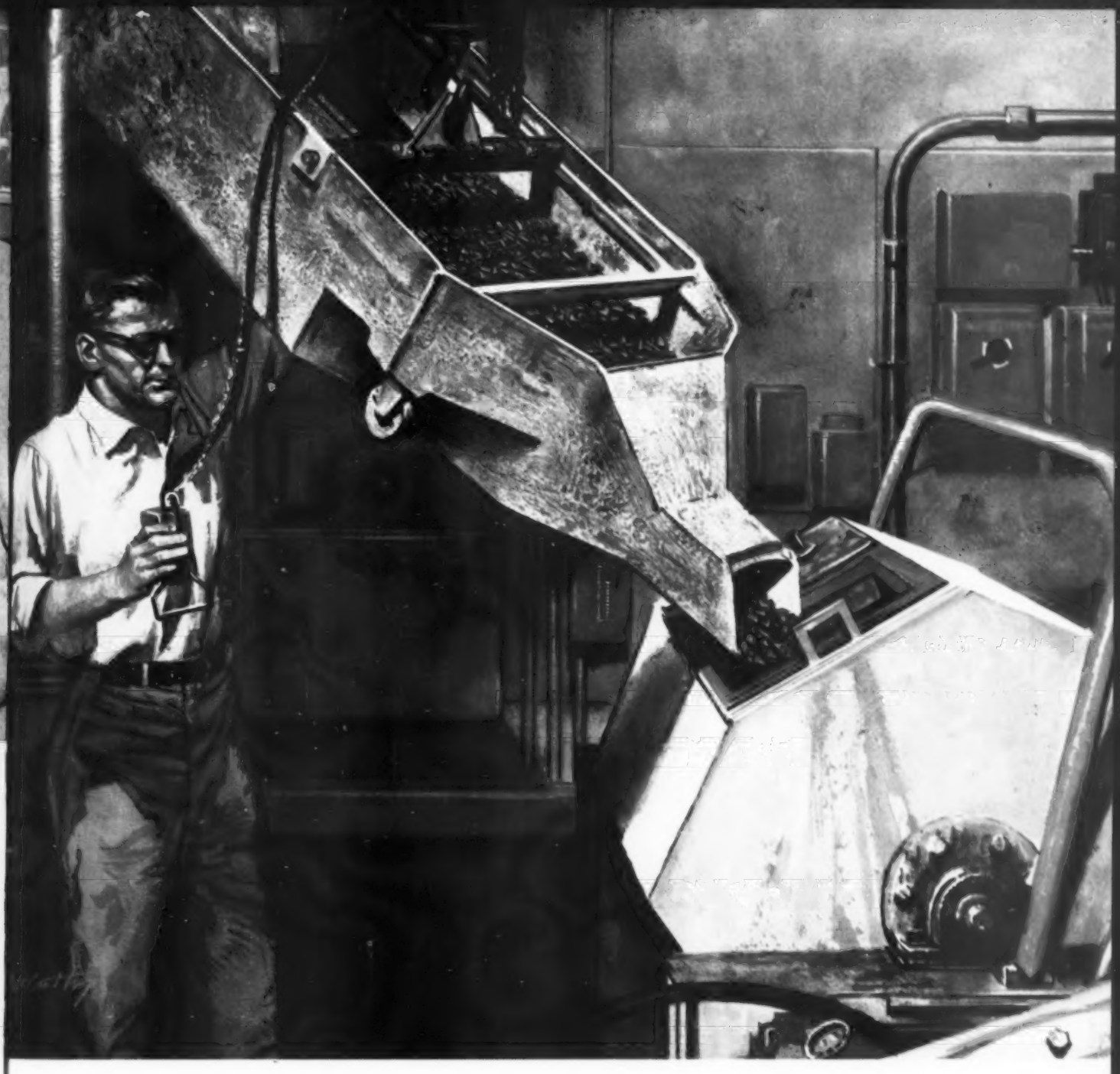
Hitchcock's Wood Working Digest
Hitchcock's Wood Working Directory

TRANSPORTATION

Mass Transportation
Mass Transportation's Directory
School Bus Trends

hitchcock
PUBLISHING COMPANY
WHEATON • ILLINOIS
SINCE 1898

THE PIONEER OF CONTROLLED CIRCULATION



The "Touch of Gold" is going into this barrel

. . . because the operator is adding Norton TUMBLEX abrasive, widely recognized as an unequalled contribution to better, lower cost finishing. For example, after shifting from hand finishing to barrel finishing with ALUNDUM TUMBLEX "T" abrasive, a leading aircraft parts manufacturer reports yearly savings of over $90,000. Norton brings this value-adding, profit-increasing "Touch of Gold" to industry in the widest range of grinding, cutting, polishing and tumbling operations . . . by the most complete line of abrasives . . . backed by worldwide resources and services.

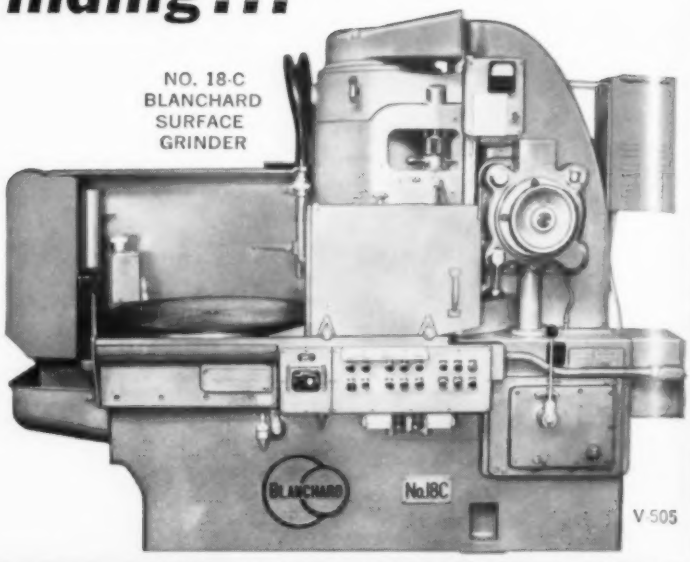
NORTON COMPANY, General Offices, Worcester 6, Massachusetts.

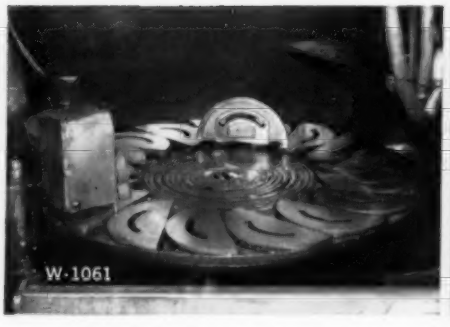
NORTON
ABRASIVES

Making better products...to make your products better

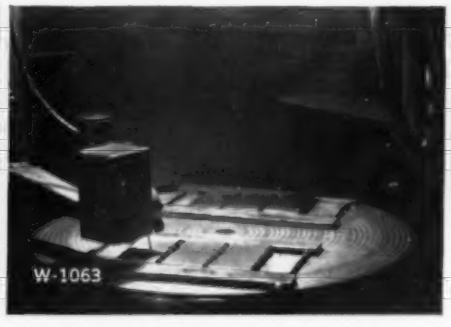
For better, easier grinding...

Whether you're "hogging" off stock from rough castings or precision grinding to a tolerance of ±.0005", you can do it better and easier with the Blanchard No. 18-C Surface Grinder. Once the work is set up, the automatic cycle handles every operation from start to finish. The operator is free to prepare the next load of work or to operate a second No. 18-C Grinder.

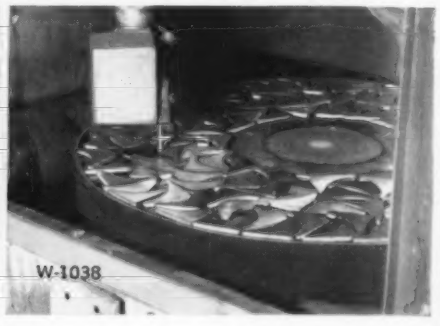




Cast Iron Plate. Blanchard ground at the rate of 30 pieces – 60 surfaces – per hour. Stock removal ⅛" each side.



Steel Bars. Blanchard ground at the rate of 48 pieces – 192 surfaces – per hour. Stock .040"-.045" from each side. Limits ±.001" square, flat and parallel.



Hot Rolled Steel Cams. One operator and one No. 18-C Blanchard produce 225 pieces – 450 surfaces – per hour. Stock removal 1/32" each side. Limits ±.001".

just push a button...

- Automatic size control to ±.0005"
- Duplication of repetitive loads
- Pre-set "spark out" time for flatness and surface finish
- No more "operator worry" on close work – greatly reduced fatigue
- A large part of operator's time available for
  (a) Handling or slushing work pieces
  (b) Filing burrs
  (c) Selecting correct wheel and preparing for next job
- Specially-designed sizing device with built-in feature to compensate – automatically – for wheel wear during grinding cycle.

All of these features give you *more efficiency at reduced costs!*

PUT IT ON THE BLANCHARD

Send for your free copy of Model 18-C folder.

THE BLANCHARD MACHINE COMPANY

64 STATE ST., CAMBRIDGE 39, MASS., U. S. A.

...offers *Engineered* INSTALLATION and testing by Trained Abrasive Engineers at no cost to you.

Mid-West is one of only three abrasive companies offering customers a complete line of abrasive products: sandpaper, grinding wheels, honing stones, abrasive grain and grinding machines.

Highly trained abrasive specialists—backed by constant research and testing, and the production of six plants—are "on call" by anyone having abrasive problems . . . whether it be old applications, new set-ups or quality control. Your call will bring one of our skilled Product Development Engineers without obligation.

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ABRASIVE CO.

510 S. Washington St., Owosso, Mich.
MANUFACTURERS OF GRINDING WHEELS, SANDPAPER AND HONING STONES

Mid-West Abrasive Co.
510 S. Washington St.
Owosso, Michigan

Please send me, without obligation, a copy of *Engineered Installation by Mid-West.*

Name_____

Company_____ Title_____

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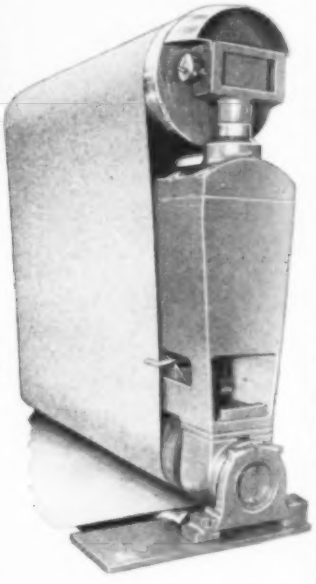
City_____ State_____

HILL Sheet and Plate polishing machine with reciprocating hydraulic table and vertical two roll head.

A HILL Polishing Machine of *YOUR OWN* will afford you important savings...

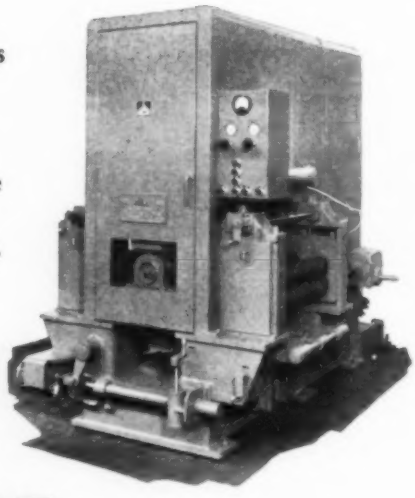
- *By eliminating mill extras.*
- *By proper finishing and prepolishing before forming.*
- *By enabling you to prepare the correct surface finish to meet each individual job need.*



IT'S MOSTLY IN THE HEAD

Two rolls accurately controlled for speeds and pressures with easy adjustment for proper tension of the endless abrasive belt. For fine finishing of all types of ferrous and non-ferrous metals.

● HILL polishing machines are now saving important percentages for manufacturers supplying the dairy and sanitation fields, for automobile bumpers, engravers plates and a wide variety of other industries.



HILL Pinch Roll type with vertical two roll head for polishing strip. Can be used singly or in multiple units for line production.

The HILL ACME Company

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"HILL" GRINDING & POLISHING MACHINES • HYDRAULIC SURFACE GRINDERS • ALSO MANUFACTURERS OF "ACME" FORGING THREADING • TAPPING MACHINES • "CANTON" ALLIGATOR SHEARS • BILLET SHEARS • "CLEVELAND" KNIVES • SHEAR BLADES

. . . wherever abrasive operations are performed

EDITOR'S PAGE

Why Standardize?

Almost everyone knows the advantages of standardization. This editorial is directed to both those who know and those who don't know.

As a review for those who know and for the education of those who don't know, standardization means a reduction in labor costs, less stocking of odd shaped parts, shorter delivery time, less material handling and shorter down time. You might be saying, "Sure that's right. I know that." But, what have you done about it? Have you considered standardization when you recommend purchases? How many different types and styles of equipment have you got in your plant that could be identical? These questions are important to your operations. Are you just talking about it or are you doing something about it.

The builders also have a responsibility in standardization. They can finalize standardization through their associations. But, they have to have your support. You must let the builders know where standardization on his equipment will benefit you the most.

It is up to you to use good judgment in requesting proposals on special equipment, for no matter how special this equipment may be there will always be areas which could be standard with other equipment in the plant. Any consideration of purchase of special equipment should first exhaust all possible use of standard equipment.

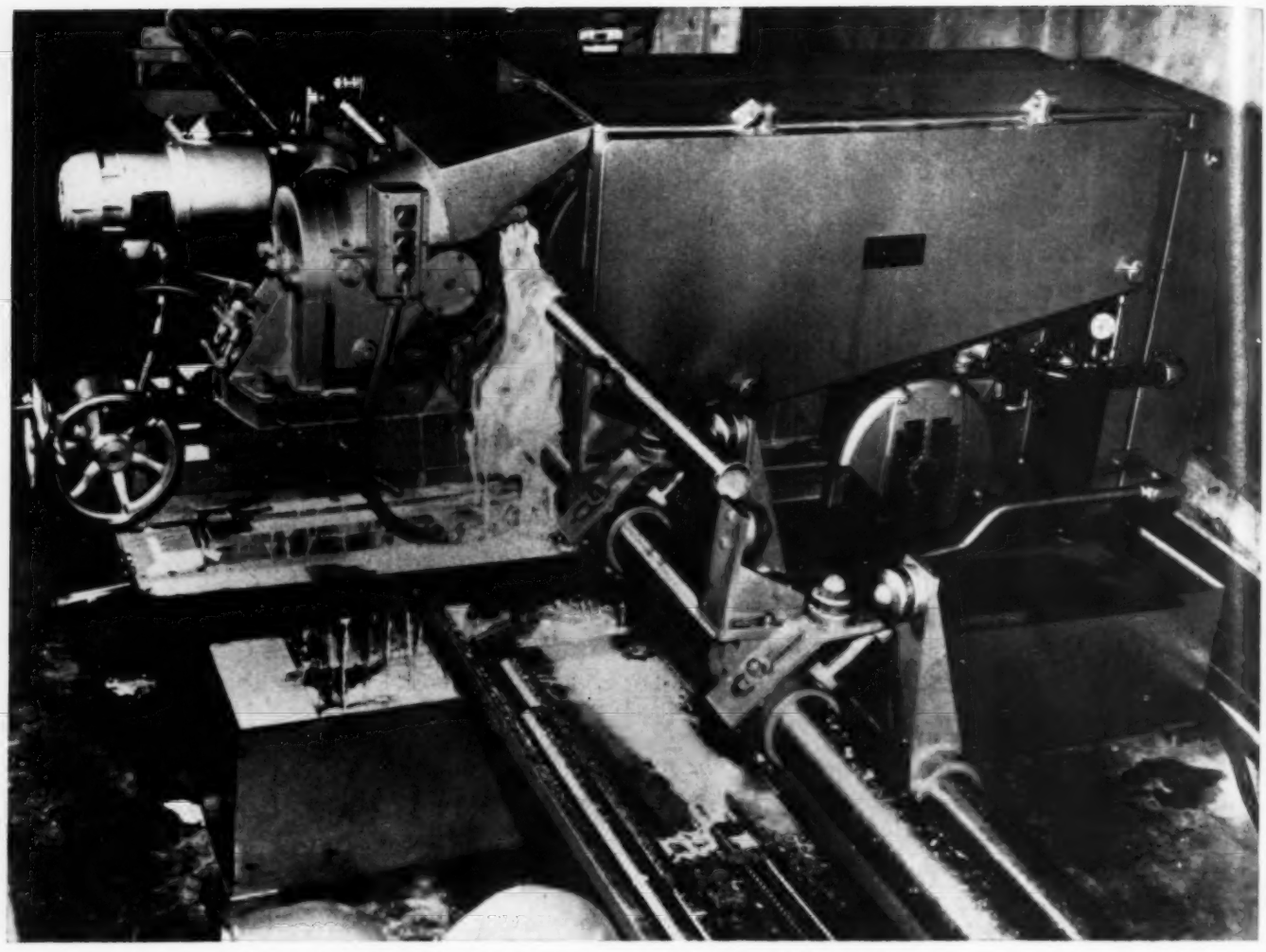
Do not misunderstand our stand on standardization to mean all features of equipment should be the same. Each manufacturer has certain features which surpass those of his competition. These should be your reason for purchase, but, there are areas of this equipment which are common and can be standardized. Be sure of these areas and request it.

The standards which should be considered are items which are common to some degree. An example of this would be coated abrasive belts. Belt sizes range far and wide with considerable grief to all concerned. The co-operation of all involved parties can and will standardize on the sizes. We understand the Coated Abrasive Manufacturers Institute is now working on standardization of belt sizes. In this issue we have discussed many of the newest coated abrasive machines. Their development has been outstanding. We hope that these developments have included or will include standardization.

It is up to you to start the move toward standardization. It is up to the manufacturer to design for standardization.

W. W. Patterson

MANAGING EDITOR



This heavy-duty centerless grinder is designed for precision work at high speed on rod or tube stock up to 8 in. OD. Through-feed rates range from 4 in. to 40 ft. per min. (Engelberg-Huller Co., Inc., Syracuse, N.Y.)

The Newest in Coated Abrasiv

- ***From Mechanical descaling to precise finishing.***
- ***Internal grinders, roll grinders, tongue grinders, centerless grinders and die polishers all coated abrasive machines.***

AUGUST, 1958

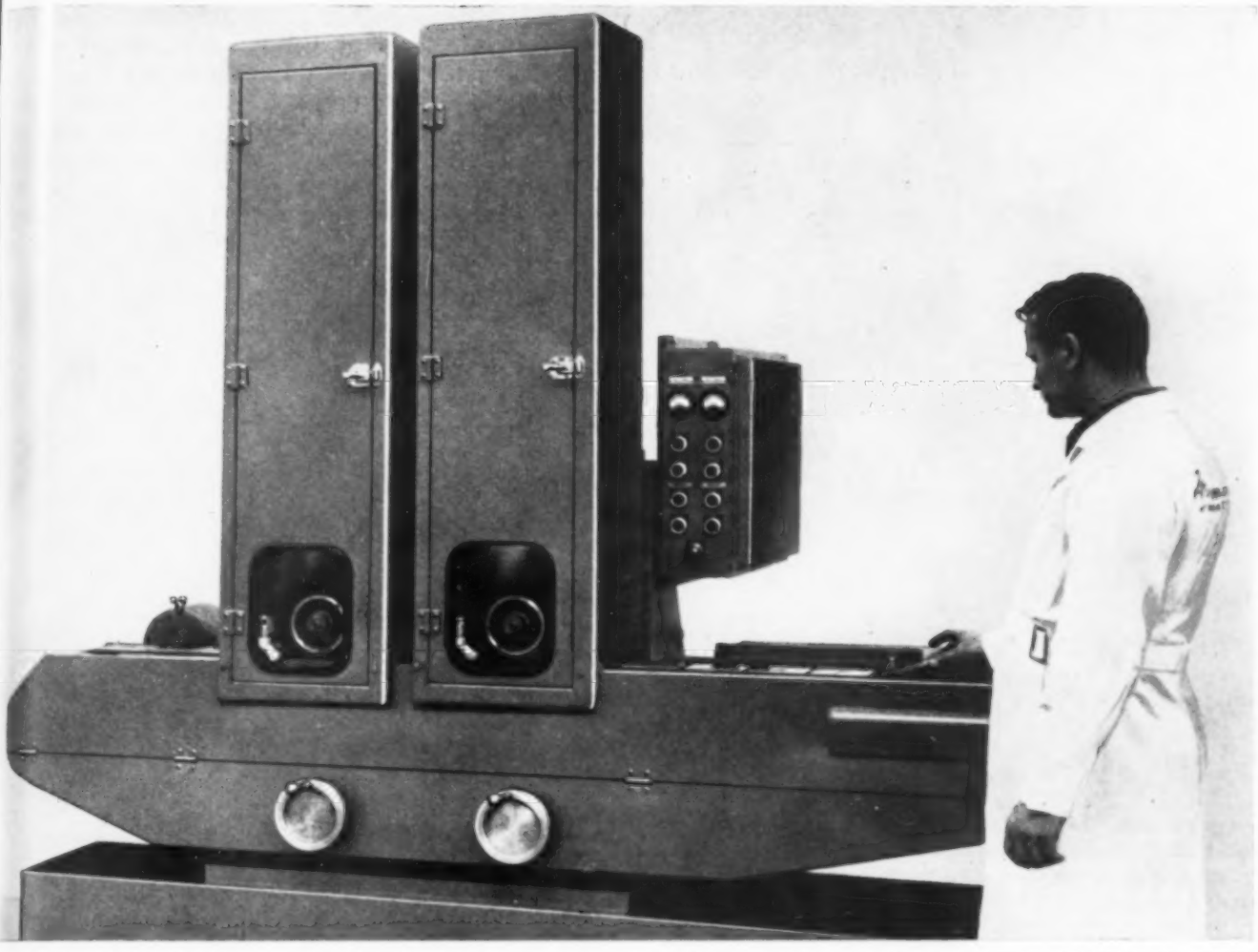
By **M. M. Patterson**
Managing Editor

● Coated abrasive production machinery is what was shown at the recent 3rd National Coated Abrasive Machinery Show at Behr-Manning. There was little doubt that this equipment is designed for something more than sandpaper. Exhibiting were machines ranging from large, heavy and versatile machines for mechanical descaling to precise finishing machines for close tolerance work on specific parts. All the machines exhibited were considerably heavier and more precisely made than the common reference of sandpaper implies.

Pinch Roll Grinder

The most outstanding machine power-wise and development-wise was the big 50 inch pinch roll grinder developed jointly by Behr-Manning and Hill-Acme engineers. Being tested primarily for mechanical descaling of bumper stock, this machine and technique has been improved from using one belt on each sheet passing through to 140 sheets per belt.

Mechanical descaling without chemical preparation would mean the elimination of the pickling operation. By bringing the untouched sheets down to 40 or 80 grit grinding that normally follows pickling, this machine removes several difficult problems. Disposal of the pickling agent would no longer be necessary. Acid etching would be eliminated and by using only one machine in place of the pickling



A two-head flat finisher uses an abrasive belt as a conveyor and two belts, usually of different grits, as the finishing medium. These machines, available in several widths, may be operated wet or dry. Grinding belt and feed speeds are variable. (Hammond Machinery Builders, Inc., Kalamazoo, Mich.)

Production Machinery

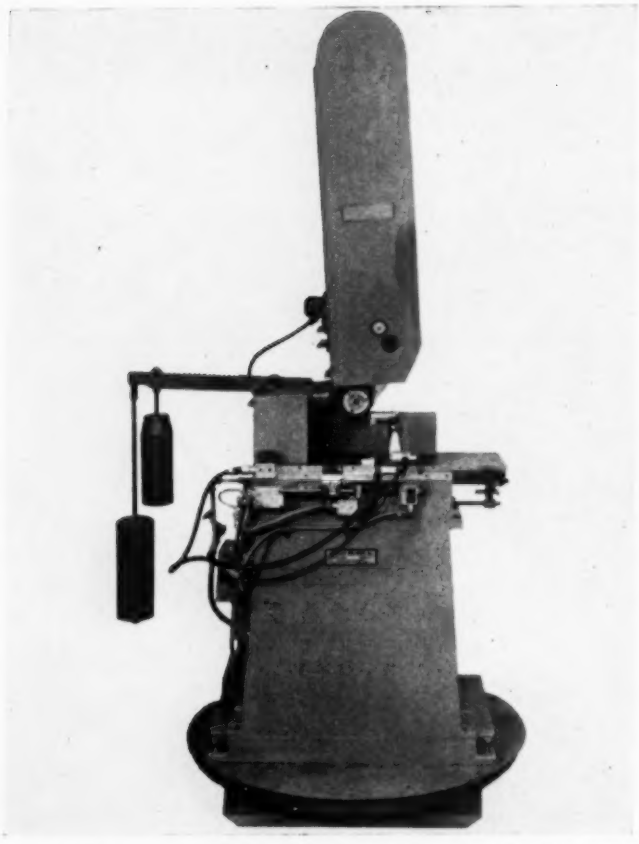
- ***New uses for abrasive belt equipment.***
- ***The latest in coated abrasive processes.***
- ***Specifications on the newest machines at the Coated Abrasive Machinery Show.***

and 40 to 80 grit grinding floor space, difficult material handling and control problems would be greatly reduced.

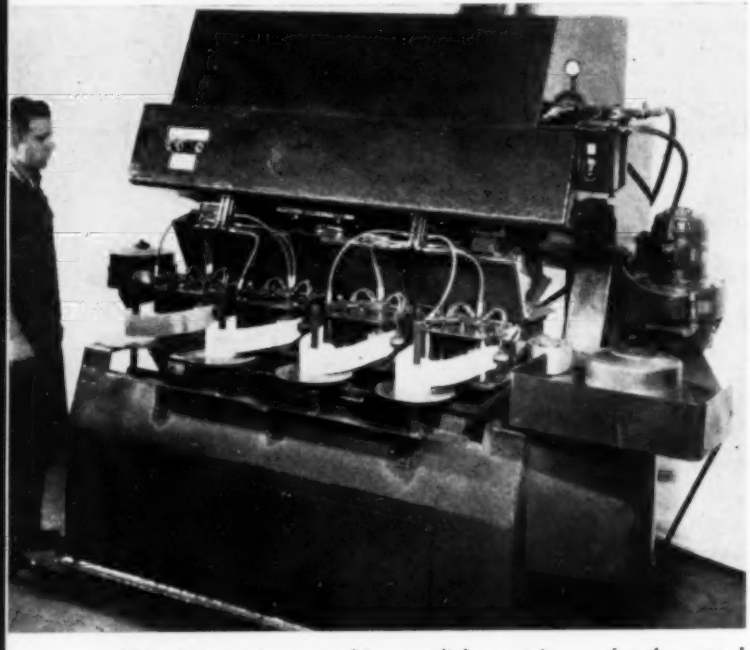
Still in the experimental stage the machine is powered by a 150 HP motor, designed for 48 inch belts with speeds from 1000 to 6000 SFPM and feed speeds from 6 inches to 88 feet per minute. The beefed-up design will handle a complete selection of contact rolls from steel to as soft as 30 Durometer rubber. It may be used to grind dry (with an 8000 cubic foot per minute exhaust system) or wet with the flow ranging from a flood to a light spray. At the show the machine was equipped with an exhaust system and a 1000 gal. filtration system by the Industrial Filtration Corp. which reverses flow when screens become loaded.

Longitudinal Polisher

Another important machine shown was the Murray-Way square tubing polisher which has attracted a great deal of interest in the metal furniture industry. This longitudinal polisher consisted of four polishing heads mounting Behr-Manning flap wheels. The floating heads can be positioned to handle all external surfaces of rectangular tubing in a single pass. Any practical succession of grits can be used by installing additional sections. Each head is driven



An ingenious rise-and-fall belt grinder is blending the radii of 3600 jet engine blades per day. It is equally adaptable to other contoured parts such as tools or cutlery. A reciprocating table carries the work past a cam-controlled contact wheel. Loading and release are automatic. (Abrasive Machinery, Inc., Oneida, N.Y.)



This interesting machine polishes strip and tube stock longitudinally, indexing abrasive roll stock to a variable number of work points each of which is supported by a platen. Platens, pneumatically operated, oscillate in a direction parallel to the travel of the work, and are used in pairs to polish both sides of strip stock at feed speeds up to 50 fpm. (Kearsarge Engineering Corp., New London, N.H.)

by a 7½ HP motor. Feed rolls are driven by 2 HP motors for feed through at variable rates of which 20 feet per minute is considered normal.

Using 4 inch wide coated abrasive rolls automatically indexed in use, another longitudinal polisher was displayed by Kearsarge Engineering Corp. This machine was polishing steel strip from coils. However, this machine may be adapted to polishing tubes, bars and symmetrical shapes. Polishing both sides of the continuously fed 5 inch coiled strip is accomplished by four sets of reciprocating platens (two platens to a set, one on each side) at feed speeds up to 50 feet per minute. Head travel, operated by air, oscillates parallel to travel of the work. Each polishing shoe is fed from a roll of abrasive stock which is indexed into position as it is needed. It is regarded as certain that this machine will be called on to polish wire for high tension steel springs before their forming because its action avoids the circular grit lines imposed by centerless polishing which open up as the spring is formed, possibly introducing fracture points in the wire.

Roll Grinder

A number of very interesting pieces of equipment were shown by Ryman Engineering Co. One was a roll grinder unit readily mounted on available lathes with a minimum swing of approximately 26 inches. This 600 lb. unit drives an abrasive belt 4x106 inches at 6000 SFPM, holding close tolerances and maintaining good control of dust while removing stock. The base can be rotated to present the slack area of the belt to the work, so low microinch finish can be developed. Where heat dissipation is important, the grinder can be operated with mist. Belt tension is by an air cylinder. Contact wheel is 8 inches in diameter and driving motor is 7½ HP, 3600 RPM.

Internal Grinder

Also in the Ryman booth was an internal belt grinder. This unit can be attached to either a lathe or a vertical boring mill. The belt is powered by a 5 HP motor and tension is held by an air cylinder. The offset grinding head provides for grinding and polishing inside diameters.

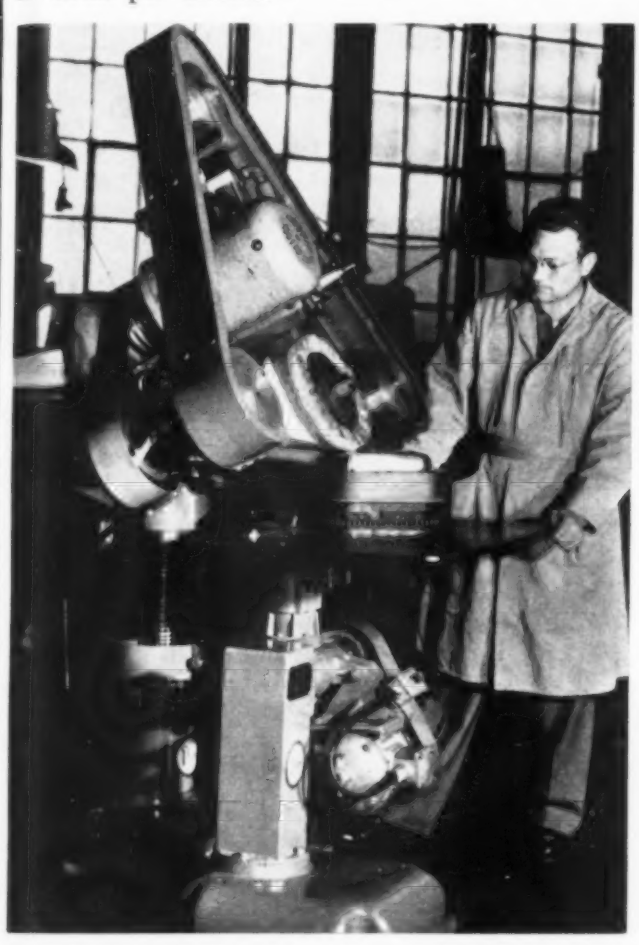
Tongue Grinder

Versatility was exemplified by Bush Mfg. Co. which showed an improved table tongue sander. This belt grinder is a versatile I.D. and O.D. sander readily adaptable to complex and eccentric inside and outside contours. The 24 x 24 inch table and the grinding head both tilt, a first for this type of equipment. Grinding heads adjustable to 8 inches vertically with a range of ¼ to 2 inch wide yoke and yokeless type wheels, give this machine a scope of operation not previously attained on belt grinding of this type.

Centerless Grinder

One of the exhibits emphasizing precision was a centerless grinder by Engelberg, Inc., which introduced automatic gaging by air flow and correcting for wear of the belt by moving the work holding

slide nearer the belt. Test bars are used to set gages when a belt is replaced. Constant measurement and control of finish diameters permits these grinders to hold a tolerance of .0005 inches. Using an abrasive belt 8 x 132 inches and feeding work from 4 inches to 40 feet per minute, a major feature is a work capacity of 1 inch to 8 inches in diameter. The machine is capable of removing as much as 2 pounds of metal per minute.

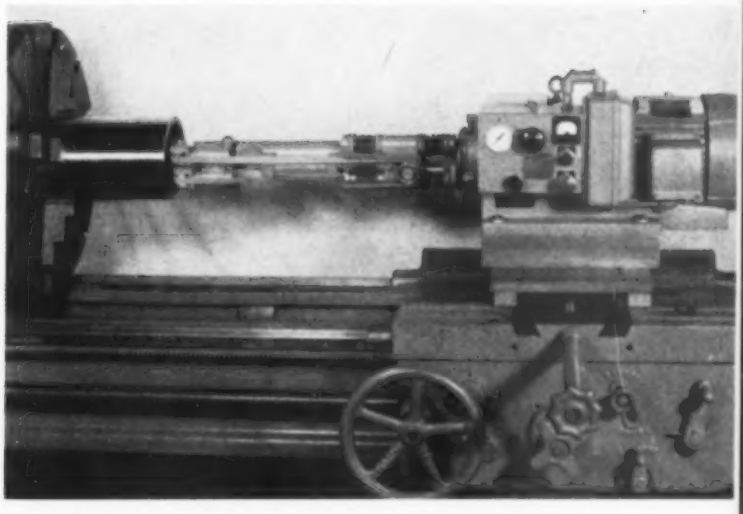


Here a powered chuck keeps contoured work in contact with a coated abrasive belt formed by a shaped contact wheel. Substitution of a platen adapts the machine to flat surfaces. The chuck can be set to index automatically. (Divine Brothers Company, Utica, N.Y.)

Engelberg showed several other machines although it was another centerless which created the most comment. This machine with a rotor fixture of 4 inch diameter capacity requires the operator to merely load the part in the fixture and push the button, the electro-hydraulic controls do the rest. From load position the table traverses to infeed position. As the table begins to infeed, it is automatically oscillated to utilize the full width of the abrasive belt.

Die Polisher

A die polishing machine was featured at the Hartford Special Machinery Co. booth. With a capacity of from ¼ to 3½ inches inside diameter, this machine polishes substantially parallel to the line of draw. Using a work table speed from 80 to 180 RPM and an abrasive belt speed of 5000 lineal feet per minute, the abrasive belt can be adjusted by idler pulleys above and below the work table to contact all of the drawing surface or so that bell mouth conditions will not occur. This machine removed .006 inches from a .615x ¾ inch carbide core in 15 seconds using a diamond belt. Minor conditions of out of round or slightly offset cores are automatically compensated for.

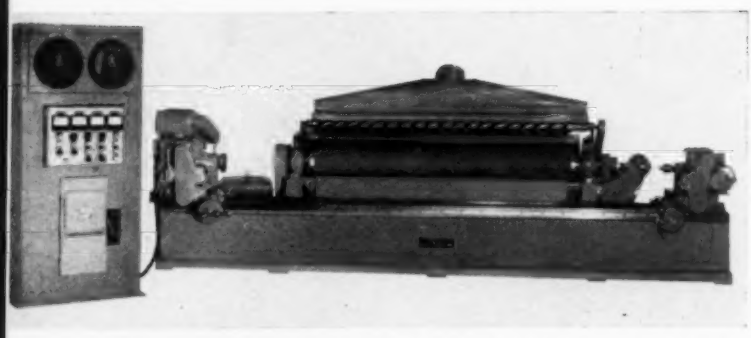


This unit is an internal belt grinder which can be attached to either a lathe or a vertical boring mill. Powered by a 5 HP motor, the tension is held by an air cylinder. (Ryman Engineering Co., Ellwood City, Pa.)

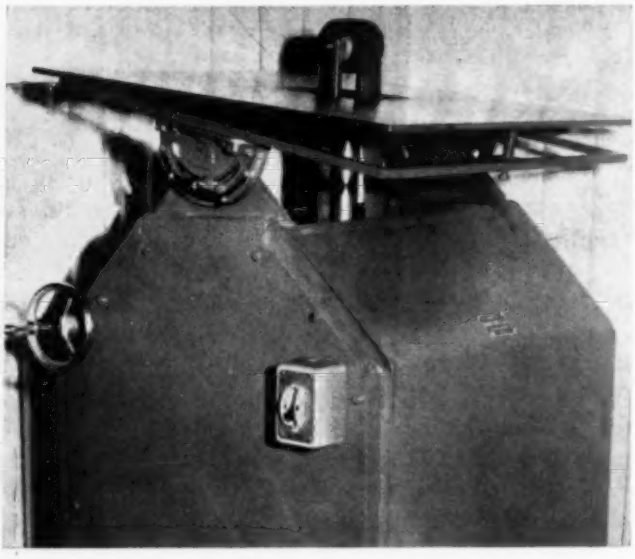
Flat Finishers

Hammond Machinery Builders, which had one of the largest displays at the show, featured several flat finishers. These are designed for wet abrasive belt grinding, polishing and deburring of flat work. Their multi-head machines incorporate such features as; two roll head design, air tension for belts, screw feed adjustment for depth of cut, v-belt driven contact rolls, air tension, variable speed endless conveyor, permitting continuous through feed and work pressure ammeters on each head.

On this heavy-duty centerless grinder, coated abrasive belts serve to feed as well as grind the work. Traverse reversing does away with returning long pieces to the infeed end of the machine, and powered fixtures at each end drive rolls which aid in feeding heavy work pieces. Selection of contact wheel and belt allows variation from heavy stock removal to micro-inch finishing. (Production Machine Company, Greenfield, Mass.)



A new rubber roll grinder will handle rolls up to 80 in. long and 20 in. in diameter without special fixturing. It can hold tolerance of 0.001 in., registering the diameter of the roll being ground in 0.001-in. increments of 12-in. dials. The oscillating cylinder is water cooled. (Curtin-Hebert Co., Inc., Gloversville, N.Y.)



The combination of a tilting table and tilting grinding head enables this tongue sander to perform well on concave or convex contours. Contact wheels range in width from 1/4 in. to 2 in., and may be yoked or yokeless. (Bush Manufacturing Co., Clawson, Mich.)

A new R-58 Cosmowheel, a contact wheel over which a coated abrasive belt is run, is made in a face width of 1 in. and can be ganged to any desired width. (Chicago Rubber Company, Inc., Waukegan, Ill.)

Rise and Fall Grinder

A number of inquiries were received by Abrasive Machinery, Inc., on its rise and fall grinder which uses cams to generate curved surfaces. Successful on parts such as jet blades and golf club heads, the machine is now being studied for use with low cost commodities as hammer heads, wrenches, etc. The workholding fixture and suitable cams are mounted on a single plate, so workpieces of different shapes can be accommodated without lengthy down time. The air driven table reciprocates through a stroke of up to 6 inches and the cam follower is the same diameter as the contact wheel, permitting use of a full scale cam.

Rubber Roll Grinder

Accommodating rubber rolls from 0 to 80 inches in length and from 4 to 20 inches in diameter, the Curtin-Hebert Co. rubber roll grinder holds .001 inch tolerances. The diameter of the roll being ground is constantly indicated in .001 increments on 12 inch selsyn indicator dials. Special design of the machine and the precision of the drum which is spiral wound with an abrasive cover provide the high accuracy.

Swing Grinder

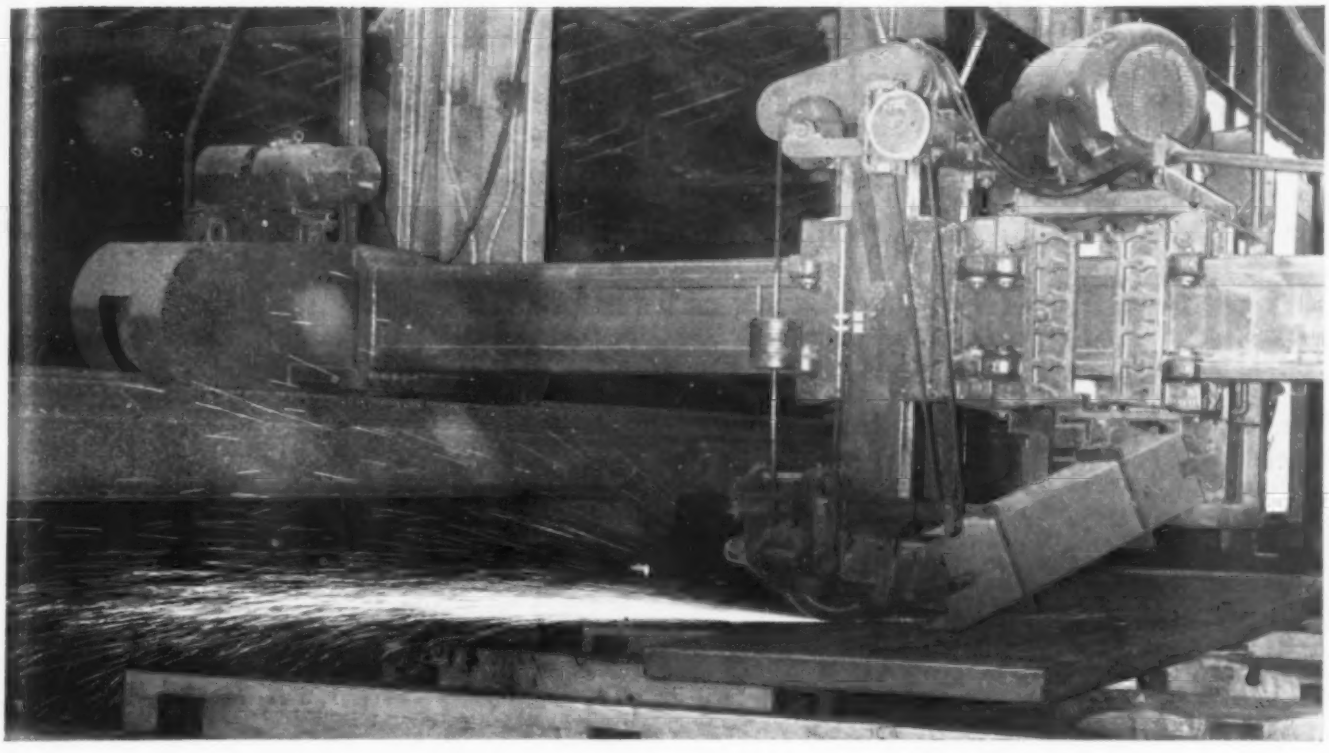
Designed to do difficult grinding jobs quickly and with a minimum of operator fatigue the abrasive belt swing grinder shown by Grinding and Polishing Machinery Corp. is in use on a wide variety of applications, from hot and cold rolled steel to bronze and aluminum. Range of jobs extends from surface cleanup to grinding and polishing of cylindrical surfaces. This heavy duty grinder consists of a 7½ HP motor, belt speeds 5500 or 7500 SFPM, 3 x 132 inch belt, with air tension and extra wheel attachments for contour or slackbelt grinding.

Centerless Grinder

Production Machine Co. exhibited their centerless grinder with power fixtures. This heavy duty, precision built unit uses coated abrasive belts for work feed as well as grinding. A traverse reversing device, operated manually or automatically, does away with returning long workpieces to the infeed end of the machine. With steel contact wheel and belts of coarse or medium grit, the machine can perform heavy stock removal work. In minutes contact wheel and belts can be changed to produce low microinch finishes. Machine capacity is ¼ to 4 inches O.D. with belt speed of 3500 SFPM, the grinding belt being 6 x 168 inches, feed belt 6 x 47 inches and main drive motor 15 HP with 1 HP feed drive.

A complete line of plain and serrated rubber contact wheels, including the new Cosmowheel of rubber with steel re-inforced sides and deep serrations were exhibited by the Chicago Rubber Co.

A variety of cloth buff-type wheels as well as a wide selection of light and heavy grease sticks were shown by Formax Mfg. Co. These wheels form themselves to the shape of the workpiece at the point where polishing pressure is applied across the wheel face. • • •



Hot-pressed snagging wheel on mechanical grinder removes up to 180 pounds of metal per contact hour, at head pressures ranging from 400 to 650 pounds. (Photograph courtesy Ty-Sa-Man Machine Company)

Why Super-Dense Resinoid Wheels Cut Snagging Costs on Stainless, Alloy Steels

by **Norman P. Robie**
Assistant Research Director
Electro Refractories & Abrasives Corporation
Buffalo, New York

• The expanding use of mechanical snagging machines has accelerated a demand for more durable and longer-lasting grinding wheels. Specifically, it has sparked the development of hot-pressed resinoid snagging wheels which can stand up under the pressures required to give the increased rate of stock removal and lowered costs per pound of metal removed, which the machines make possible. Developing higher horsepower than hand grinders, these machines can be used with downhead pressures which cause cold-pressed wheels to spall and wear rapidly. Hardening old type cold-pressed wheels to obtain longer life is not the answer, because the increase in life does not compensate for the reduction in rate of metal removal. The problem, then, was to get a wheel that would cut as freely or more freely than cold-pressed snagging wheels, but with greater efficiency. Hot-pressed super-dense wheels capable of removing up to 180 pounds of metal per contact hour are meeting these requirements adequately and have found wide acceptance in the field.

Swing Grinding

Grinding to remove surface defects and scale prior to the rolling of the finished product is an essential operation in the production of stainless steels, high-alloy steels, tool steels, ball-bearing steels and titanium metal. Though practice varies with plants and products—depending, for instance, on whether the grinding is done on ingots, slabs, billets, or sheet bars—the essential purpose of efficient stock removal is the common denominator of all snagging. This conditioning operation is often referred to as swing grinding because the machine is suspended so that it can be swung from one position to another to grind a wide area, or swung out of the way so that the workpiece may be shifted around.

Cold-Pressed Resinoid Snagging Wheels

The traditional recommendation for snagging has been a coarse-grit, cold-pressed resinoid wheel of a

- *Higher head pressures–up to 600 pounds.*
- *Increased production–180 pounds of metal removed per contact hour.*
- *Fewer man-hours per net ton ground.*

relatively hard grade. In these wheels there were three important components–abrasive, bond and pores–that could be varied. The grade and structure of the wheel resulted from the combination of these elements. Abrasive could be varied from a very friable alumina to the tough blocky types which are usually preferred for snagging. The bond, a high quality phenol-formaldehyde resin, was varied by adding different quantities of inorganic fillers such as powdered cryolite. Structure and grade depended primarily on the per cent by volume of the components which go to make up the wheel and on the type of bond. At one time, given amounts of bond and abrasive were pressed with differing pressures to obtain different densities, but this practice has given way to the so-called "stop-molding" method, in which a given amount of mix is placed in the mold cavity and pressed to a predetermined volume. Pressing was done at room temperature and though temperature and humidity often were closely controlled, the molding, baking and finishing operations were relatively uncomplicated. Many resinoid wheels are made today by these methods.

Super-Dense Wheels

The making of super-dense wheels involves a radically different type of formulation for the bond and filler, as well as changes in pressing technique. The ordinary heat-hardenable resins are now combined with modifiers, such as other thermosetting resins, thermoplastic resins, synthetic resins and other materials, which change the heat resistance, toughen, or otherwise modify the phenolic resins. In this manner, the bonding action and the heat resistance of the

EFFECTS OF DOWNHEAD PRESSURE ON METAL REMOVAL, WHEEL LIFE

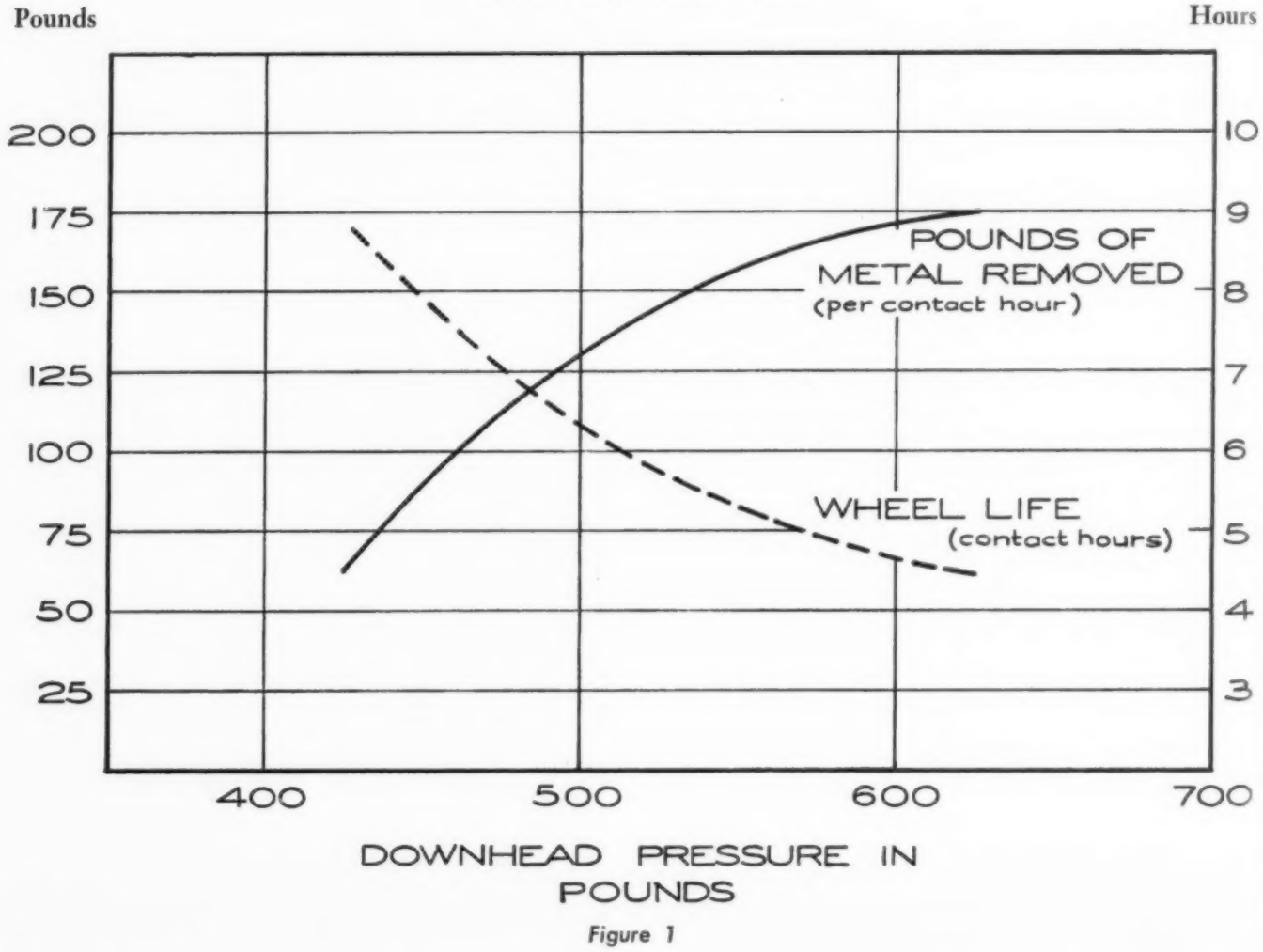


Figure 1

phenol-formaldehyde resin can be varied. The abrasive used in the majority of super-dense wheels is a tough, blocky fused alumina. The so-called microcrystalline variety of fused alumina is often used. In this variety the grits are composed of small alumina crystals with titania in solid solution, cemented by a slag of impurities.

In addition, chemical and mineral fillers have been developed which are capable of melting, decomposing or reacting at the point of grinding contact to prevent rewelding of the metal surfaces. Sulfur, fluorine, chlorine and phosphorus, the active elements in these fillers, are also often present in high-pressure lubricants and soldering pastes. To get the low porosity characteristic of super-dense snagging wheels, the composition must be pressed at a temperature hot enough to melt and compress the resin bond under pressure. This is, of course, a slower and more costly process than cold pressing. Finishing operations on super-dense wheels, because of their extreme hardness, are more laborious. From raw materials to shipped product, this new-type grinding wheel is more difficult to make and more expensive, but the results justify the extra cost.

Wheel Performance

Hot-pressed wheels permit higher grinding pressures with harder wheel grades to give more economical performance. Used with hand swings, the metal removal will usually be between 50 to 70 pounds per contact hour. With mechanical grinders, metal removal rate per contact hour may well run as high as 180 pounds per hour, at head pressures ranging from 400 to 650 pounds. The available data from mechanical grinders presently in use indicates that increased pressure produces faster metal removal up to about 600 pounds. (See Figure 1) It will be seen that production in terms of metal removed per contact hour increases at a much greater rate than the increase in pressure, up to about 600 pounds pressure. Wheel life definitely decreases as pressure goes up, but the total production per wheel (pounds of metal removed per contact hour multiplied by the number of contact hours) remains reasonably constant. At present it appears that an increase of head pressure over 600 pounds does not bring corresponding increases in production, and may tend to shorten wheel life still further. New developments may make even higher pressures more practical. Since these are composite figures, the actual results at any one mill may vary. The pattern of results, however, should approximate what is shown.

There is hardly sufficient evidence at the moment to warrant specific recommendations as to head pressure; each user, with competent engineering help, needs to decide this for himself on his specific applications. It should be obvious that grinding pressures should not be increased over optimum efficiency in terms of pounds of metal removed per pound of wheel consumed, not to a point at which the depth of cut results in too high a percentage of stock removal.

Since hot pressed wheels are also used on manually operated swing frame grinders, some comments and comparisons regarding hand swings are in order. These machines usually operate at a head pressure of 100 to 250 pounds, depending on machine balance, weights added to the wheel head, and the pressure exerted by the operator. If there is too great pressure at the wheel head before the operator brings his pressure to bear, the machine becomes unwieldy. It is to be expected that a hot pressed wheel would have longer life than a cold pressed wheel under the same circumstances, though the final choice of the wheel for a particular application would not rest on wheel life alone. A hot pressed wheel on a mechanical grinder might well last only one-third of the time that it would on a hand swing, but would remove metal at twice

FACTORS AFFECTING SNAGGING COSTS

- Shape and size of product
- Analysis of material
- Surface condition (scale, defects)
- Rolled finish of steel (knurling)
- Heat in product ground
- Finish required
- Per cent of metal removed
- Beds and equipment for handling steel
- Grinding machine condition
- Type of grinding wheel
- Wheel size (diameter, thickness)
- Wheel speed
- Head pressure
- Rate of wheel traverse
- Operator technique (wheel angle, etc.)
- Pay plan

Figure 2

to three times its rate on the hand grinder. Over-all production per wheel, as indicated above, remains relatively constant.

Super-dense wheels do not spall nor wear as rapidly as cold-pressed wheels under increased pressure, and they remove metal at a high rate, with a lower grinding cost per pound of metal removed.

Costs

Actual costs per net ton of steel ground can vary considerably. Because of the factors listed in Figure 2, it is difficult to arrive at firm figures to show actual savings effected by changing from hand swing to mechanical grinders. Definitely there are savings, but the specific results for each application have to be determined individually. All factors must be considered, including capital expenditures for buildings, machines and other necessary equipment. Figure 3 shows some typical reductions in man-hours per ton with mechanical grinders as compared with hand swing grinders. In both instances, hot-pressed wheels were used.

Precautions

Though hot-pressed snaggers are generally stronger than cold-molded snaggers, it is strongly recommended that they be protected against sudden and extreme temperature changes. For example, an ice cold wheel should not be subjected suddenly to high grinding temperatures. Such temperature changes subject a

grinding wheel, with its relatively low heat conductivity, to expansion and contraction strains which are very undesirable. All wheels when not in use should be stored in a dry place at normal room temperature.

Theory of Super-Dense Wheels

The theories on which the development of super-dense wheels are based go back to the early success of cryolite as a filler for resin bonded grinding wheels. A number of theories have been advanced to account for the superior behavior of cryolite, which attempt to tie together certain physical and/or chemical phenomena involved. The grinding wheel at the grinding point of contact reaches high temperatures, as evidenced by the incandescent metal sparks thrown off. Cryolite melts at about 1,000 deg. C. From this it has been thought that the cryolite melts and lubricates the interface between the metal and the abrasive grit. Another theory is that there is decomposition of the cryolite in the bond which opens up the wheel by releasing dulled grits. We know that cryolite is capable of high temperature reactions, particularly when other reactive mineral fillers, water vapor and carbon from decomposing resin are present. Thus it is possible that high temperature reactions occur at the point of grinding contact. The effects of high temperature reactions are sometimes observed when wheels are heated at 1,000 deg. C. to burn off the resin. With certain wheel compositions containing high fluorine content fillers, there has been enough reaction at this temperature to break down coarse grit micro-crystalline fused alumina to a smaller grit size.

It has also been theorized that grinding done in the absence of oxygen or other reactive materials produces chips with clean, uncontaminated metal surfaces which easily reweld, so that the material is merely pushed around. The pressure of oxygen and other reactive compounds produces a film on the chip surface which prevents rewelding and thus facilitates grinding. Certain reactive materials such as the fusion or decomposition products of sulfides, fluorides and chlorides are more reactive against the more corrosion-resistant steels than oxygen. These ideas form some of the background for the development of hot-pressed, super-dense resinoid snagging wheels.

Other Uses

Super-dense snaggers, due to their narrow porosity range, have a relatively narrow grade range. There are a number of snagging operations where softer, freer cutting wheels are required, and for such uses the super-dense wheels have not been suitable. Recent patents issued to the Electro Refractories and Abrasives Corporation have provided a means of increasing the porosity range of hot molded wheels, and in combination with special faster-cutting formulations, have increased the grade range of the wheels. This has made it possible to extend their usefulness into certain foundry, titanium and tool steel grinding applications. In some cases, cold-pressed "Q" grade and harder snaggers have been replaced with denser but fast-cutting hot molded snaggers. • • •

TYPICAL REDUCTION IN MAN HOURS WITH MECHANICAL SNAGGING

	Man Hours/Ton with Hand Swing Grinder	Man Hours/Ton with Mechanical Grinder
Mill "A"	1.49	0.83
Mill "B"	2.29	1.15
Mill "C"	1.9	0.7

Figure 3

Grinding and Finishing Receives 3rd Safety Award

• For the third consecutive year, the National Safety Council has presented their "Public Interest" award to GRINDING AND FINISHING. Paul Jones, Director of the National Safety Council, is shown presenting the award to Morrey Patterson (left), Managing Editor of GRINDING AND FINISHING.

This award is made annually to public information media for "exceptional service to safety." As expressed by Paul Jones during the presentation of the award, "We are proud to honor the outstanding leadership represented by these awards. Without question, mass communication media is making a tremendous contribution to the safety movement."

The award this year was presented in recognition of the regular feature "Grinding Safely," which pictured the right and wrong way to do a job safely. Also, an article concerning the revision of the American Standard Safety Code for Grinding Wheels and another on the proper mounting of grinding wheels contributed to the recognition. •

Precision Blasting Process Speeds Removal of Organic Coatings From Potentiometer Windings

• Precision sandblasting has reduced the time required for stripping organic coatings from potentiometer windings at the Gamewell Co., Newton Upper Falls, Mass., from one or one and one-half minutes down to an average of thirty seconds. Utilizing a gas-propelled abrasive moving at high speed in a controlled pattern, the stripping operation exposes the wiping contact surface needed for potentiometer control action.

The precision stripping technique permits no damage, to either the resistance wire or its mounting according to R. H. Beedle, chief engineer of the Precision Potentiometer Division. Damage to the wire, or uncontrolled reductions of cross-section, would change the resistance value of the wire, bringing undesired changes in the linearity of the potentiometer.

Stripping of the organic coatings on the potentiometer windings at the Gamewell plant is handled by an industrial Airbrasive unit made by The S. S. White Industrial Division, New York. This unit concentrates a stream of abrasive particles travelling at high speed through a small-orifice nozzle, permitting controlled removal of material to a desired pattern.

"Abrasive" Sodium Bicarbonate

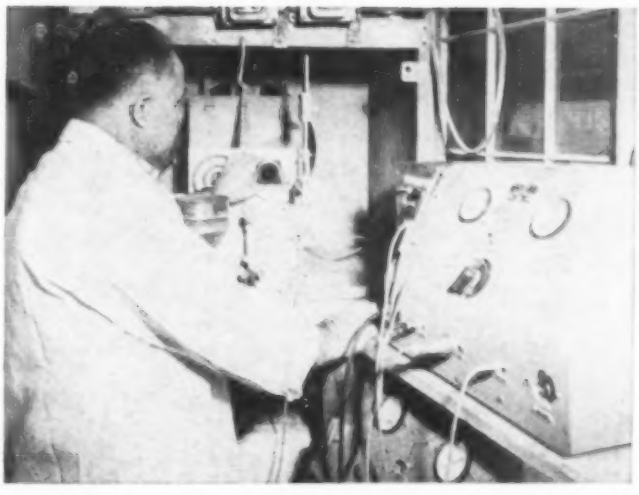
In a sense, the reference to an abrasive is somewhat misleading. An unusual feature of this stripping operation is that sodium bicarbonate, though not ordinarily so classed, has been found through experimentation to be the most satisfactory "abrasive." It removes the organic coating and at the same time has no damaging effect on the wire windings. However, special precautions are necessary in the preparation, packaging and handling of the sodium bicarbonate used for this purpose. Some aluminum oxide is also used.

The propellant gas used in the Airbrasive package unit at the Gamewell plant is nitrogen, which is neither explosive nor dangerous. Installation of such a unit is simple, requiring a minimum of piping, electrical work and ductwork.

The Airbrasive process removes material without appreciable temperature increase, vibration or mechanical pressure. The stream of abrasive particles impinges on the work at a speed of about 1100 feet per second. The resultant kinetic energy and expansion of the gas provide a fast, cool cutting action.

Types of Windings

A dozen different types of potentiometer windings are currently being stripped by the Airbrasive process at the Gamewell plant. These different types of windings can be divided into two broad classifications that are completely unlike one another. One is the more conventional type of winding in which resistance wire is wound about an annular-shaped mandrel; the other is a special type of winding around a card. Different stripping techniques are employed for each of these windings.

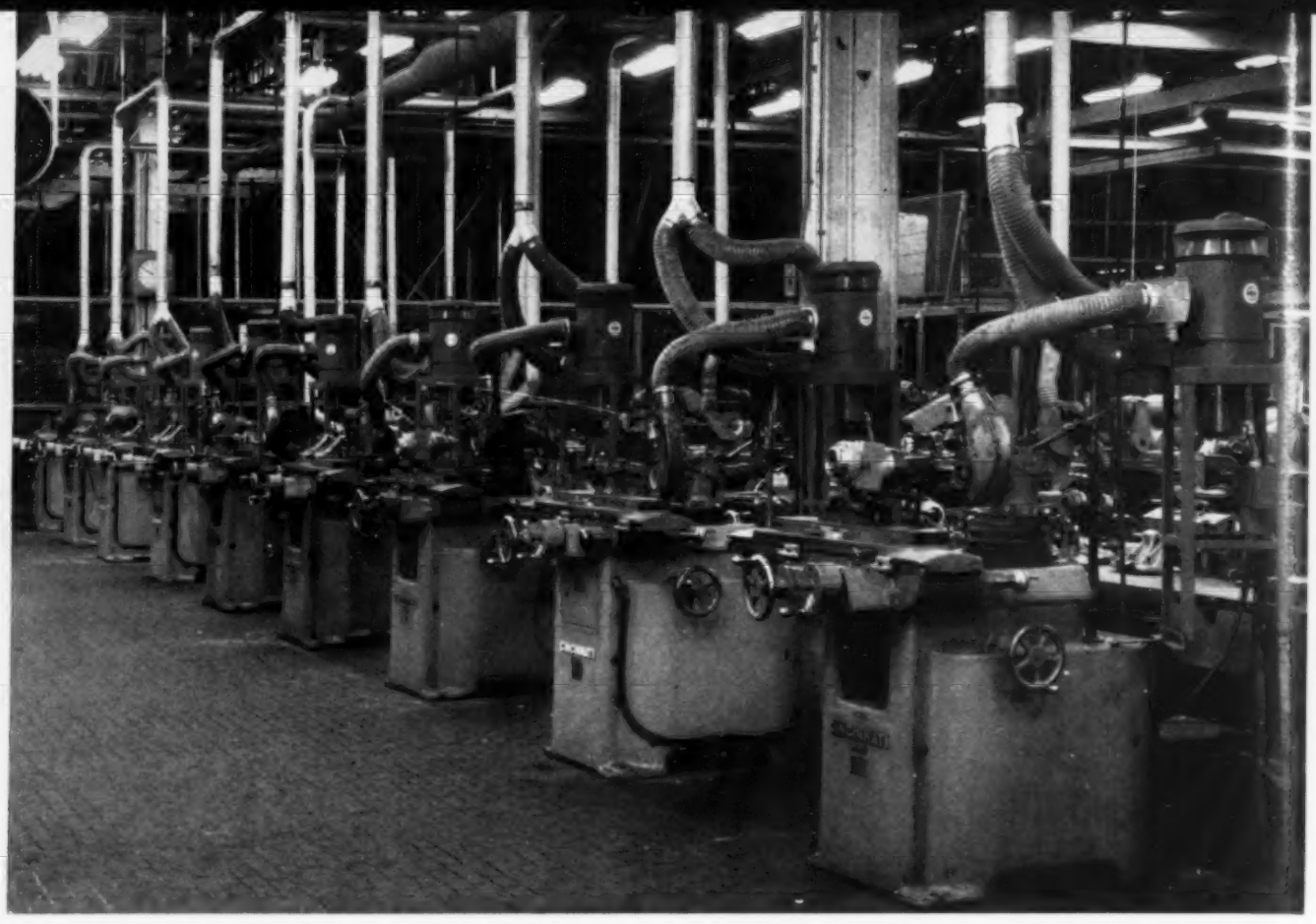


Stripping the organic coating from resistance wire windings on a card-type sine-cosine winding for a wiping contact surface on precision potentiometers made by the Gamewell Co., Newton Upper Falls, Mass. The operator is inserting card-type winding into fixture that revolves before a fixed nozzle for semi-automatic removal of insulating coating without damage to wire or support. The Airbrasive unit at right is made by S. S. White Industrial Div., New York.

The card type of winding is used for sine-cosine potentiometers. For these, it is important that the resistance wire windings be maintained permanently in straight and parallel positions as wound. The cards are varnished after winding, to maintain wires in position. The wiping contact surface is stripped of insulative coatings by the Airbrasive unit in a controlled circular pattern.

The other windings are of the Kohlrausch type. In these, the resistance wire is precision wound on a specially drawn insulated-copper mandrel of annular shape. Highly accurate pitch control assures the ultimate in potentiometer linearity.

The wiping contact surface is the inside circumference of the annular winding. An operator strips the organic coating from this area by directing the nozzle of the Airbrasive unit around the interior of the annular winding. • • •



Nine Cincinnati grinders with the diamond dust collectors are provided with a by-pass to prevent dust from wheels other than diamond from accumulating with the diamond dust.

How Buick Saves Diamond Dust

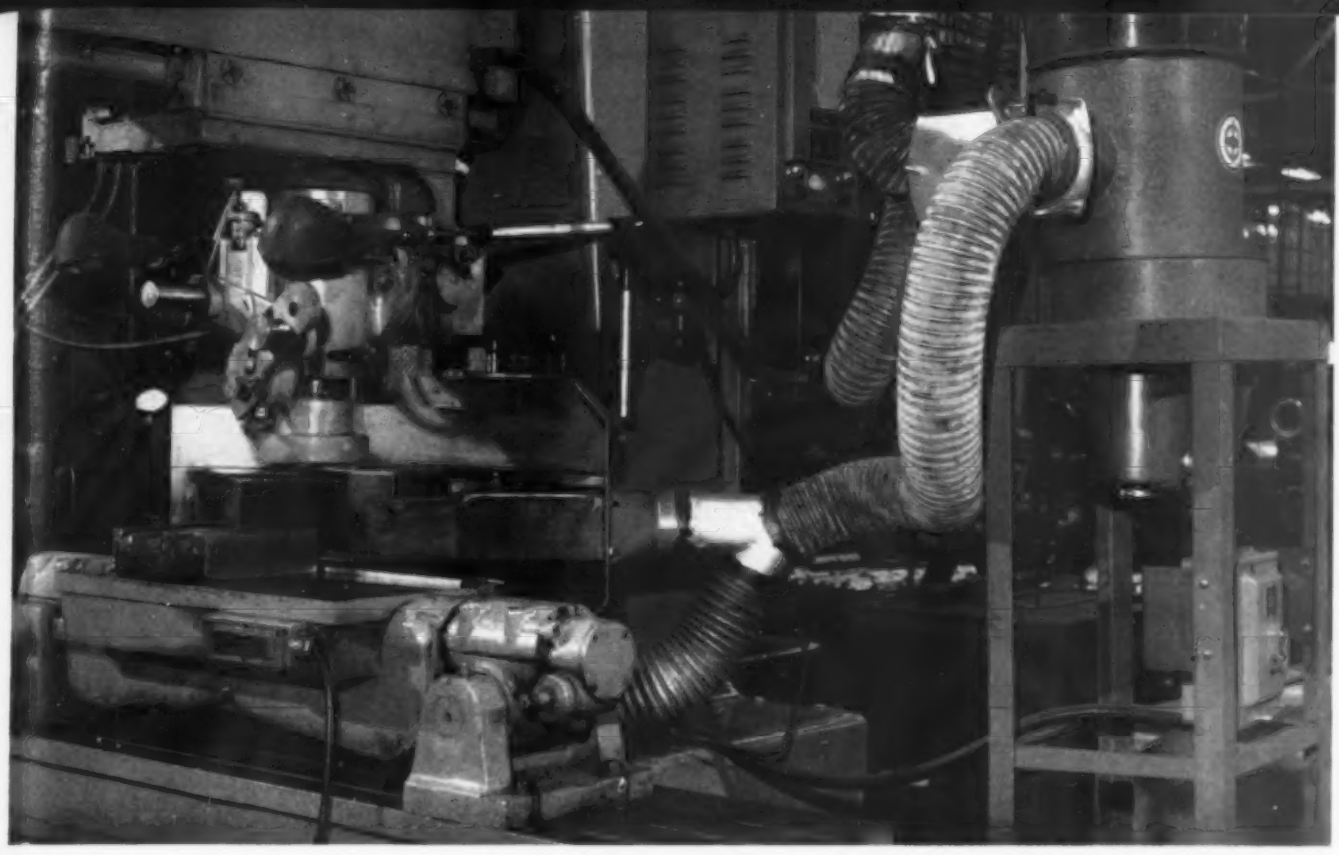
- *Average 24.9% recovery of original carats.*
- *50.5 carats recovered from 14 ozs. of diamond swarf.*
- *Small floor space, low maintenance and ease of handling features of acceptable dust collector.*

By **Morrey Patterson**
Managing Editor

• Controlled tests at Buick revealed that the diamond dust they collected was very rich in diamond bort. An average of 24.9% of the carats contained in the original diamond grinding wheels was recovered from the dust caught by the Torit Units. From 14 ozs. of collected diamond wheel swarf 50.5 carats of diamond bort were reclaimed.

These collectors manufactured by the Torit Mfg. Co., St. Paul, Minn., are designed for installation in either a central collecting system or a unit type system. At the Buick plant a unit has been mounted on a stand beside each machine. These stands are only 14" x 22". The draft needed is created by a central system of ducts with a large blower mounted above the floor. Each unit is provided with a by-pass so dust may be removed when grinding with wheels other than diamond without contaminating the collected diamond swarf.

The collector, costing no more than an average diamond wheel, operates on a centrifugal separating principle that eliminates filters entirely. The unit deposits the diamond bearing dust in a clear Plexiglas con-



Thompson grinder grinding solid carbide blades with the dust collector installed. Note the duct work which incloses the wheel as close as possible.

tainer where it can be visually inspected. When full, the top is unscrewed and the container easily emptied. No other maintenance is required.

The Cincinnati grinders at Buick perform normal cutter sharpening. The wheels are changed from diamond to other types depending on the job requirements. This necessitates the use of the by-pass which prevents the dust from accumulating with the diamond dust and increasing cost of reclaiming the diamond bort.

The Thompson grinders are used to grind solid carbide blades as large as 8" x ¼" thick. Heavy stock removal on these blades means a relatively high wheel wear. This operation demands some type of diamond dust collection and these collectors have been the answer.

One point stressed by the people at Buick was that, although the efficiency of the collectors is very high, recovery depends a great deal on the closeness of the exhaust and how well the wheel is inclosed. Ducts surround the wheel as much as possible. Clear plastic is used to cover wheels so the operator's view is not obstructed yet the draft to the duct is as concentrated as possible.

Although the Torit collectors can be used whether the grinding is mist or dry, the centrifugal principle eliminates all filters, oil baths and inflammable materials. • • •

During the grinding by the four wheels shown above 14 ozs. of dry diamond swarf was collected in the Torit dust collector. From the 14 ozs. of swarf 50.5 carats of diamond dust was reclaimed.

Why Grandmother!

Stories on grinding wheel problems—just like the kind you tell the youngsters—can have a happy ending. And we're writing new ones day after day for plants where high grinding wheel costs and low production have been wolfing up profits.

If *you* are ready to "cry wolf," let us send CINCINNATI (PD)° WHEELS to the rescue. For *now* CINCINNATI Grinding Wheels offer POSITIVE DUPLICATION—a remarkable achievement in precision manufacturing and quality control that can *save you money—and increase your production.*

Through the CINCINNATI (PD) Manufacturing Process you are assured Positive Duplication of the original wheel *every* time you reorder. "On grade" with a CINCINNATI (PD) WHEEL means all future (PD) WHEELS will act and grind exactly alike.

Yet CINCINNATI (PD) WHEELS *are priced no higher than ordinary wheels.*

So, if grinding problems have you ready to shout for help, just contact your CINCINNATI Grinding Wheel distributor. Or, contact us direct and we'll send one of our representatives —men who know grinding and grinding machines as well as grinding wheels. Write, wire or telephone—Sales Manager, Cincinnati Milling Products Division, Cincinnati 9, Ohio.

Remember—*only* CINCINNATI Grinding Wheels give you . . .

(PD) POSITIVE DUPLICATION

CINCINNATI° *Grinding Wheels*

A PRODUCTION-PROVED PRODUCT OF THE CINCINNATI MILLING MACHINE CO.

°Trade Mark Reg. U. S. Pat. Off.

grinding safely

One . . . Two . . . Three Miles A Minute

• Speed is a relative thing. In a mechanically sound automobile the sixty miles an hour which would be considered safe on a turnpike would be excessive on most two-lane roads, dangerous on a city street, and suicidal on ice. In every situation there is a maximum safe speed dictated by conditions, and no driver can go much beyond that speed without endangering himself and others.

Each grinding wheel has a maximum safe operating speed, too. In setting it, the manufacturers take into account the shape and composition of the wheel, as well as the various stresses that occur in grinding. And no operator can go beyond these limits without endangering himself and his fellow employees.

In the abrasive industry the term for speed is "surface feet per minute," usually abbreviated as sfpm. This is merely a convenient way of expressing the velocity of a point on the outside diameter of the wheel. Gadgets to convert rpm to sfpm for various wheel diameters are readily available, but essentially it's a matter of multiplying wheel circumference by the rpm of the machine, and converting the answer to feet.

To many operators, 5,000, 6,500, 9,500, even 16,000 sfpm may not seem very fast, but . . .

5,000 sfpm, a relatively slow grinding speed, is just about a mile a minute.

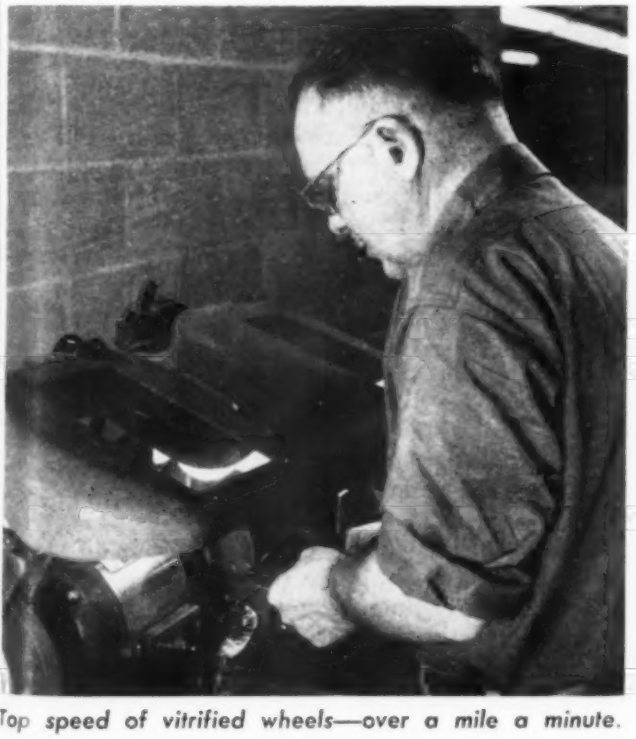
6,500 sfpm, the generally accepted top speed for vitrified wheels, is 75 miles per hour, well over a mile a minute.

9,500 sfpm, the maximum for most organic wheels, is about 110 mph, faster than a baseball thrown by a Bob Feller.

And 16,000 sfpm, operating speed for many cut-off wheels, is 180 mph, three miles per minute.

In other words, all grinding wheels operate at high speeds. And they don't often break. The wheel manufacturers go to great lengths to assure that. The machine builders design and build machines to be safe and adequately guarded, so that damage from breakage is minimized. But only the user can make sure that the guards are in place and that the wheel is operating at the recommended speed.

CHECK THE PROPER OPERATING SPEED OF ANY GRINDING WHEEL YOU USE—MAKE SURE IT OPERATES AT THAT SPEED • • •



Top speed of vitrified wheels—over a mile a minute.

Speed of cut-off wheels—about three miles a minute.

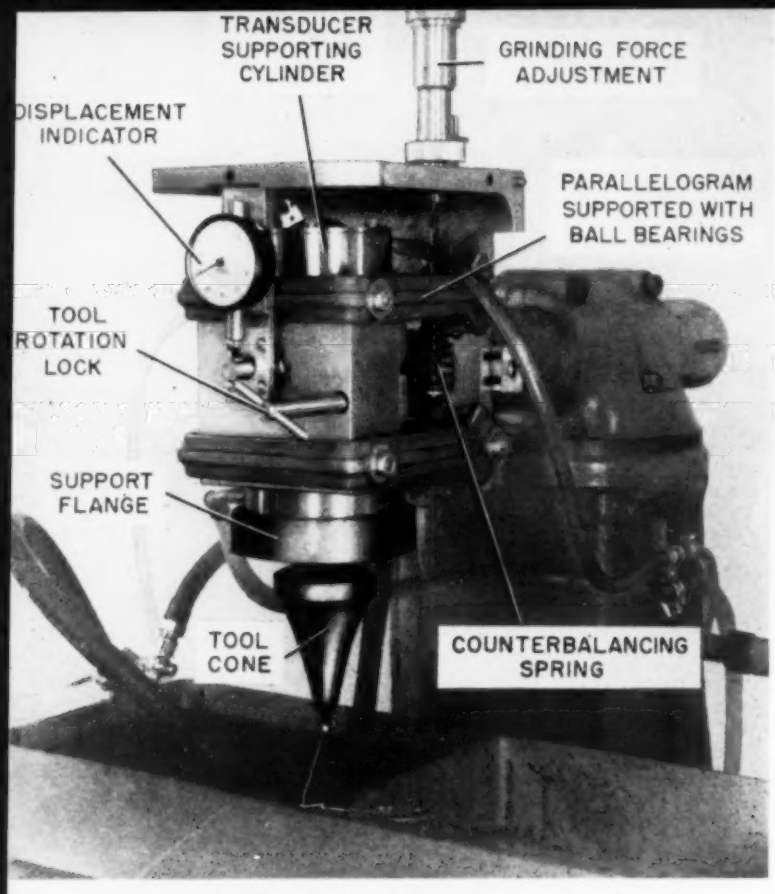


Fig. 1. Head unit of Raytheon Impact Grinder showing unique parallelogram suspension.

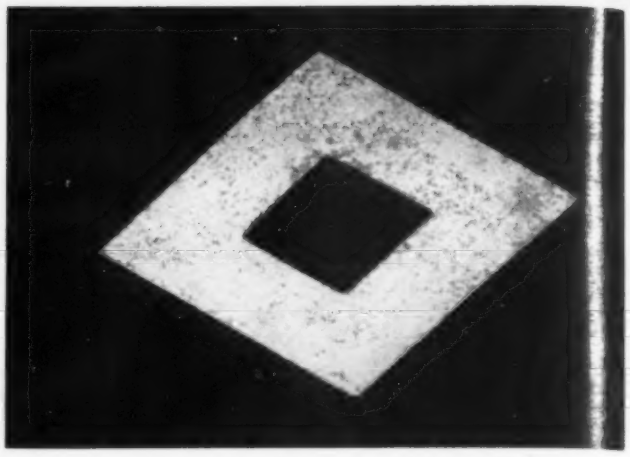


Fig. 2. Frames cut from ferrite crystal by impact grinder for electronic computer research.

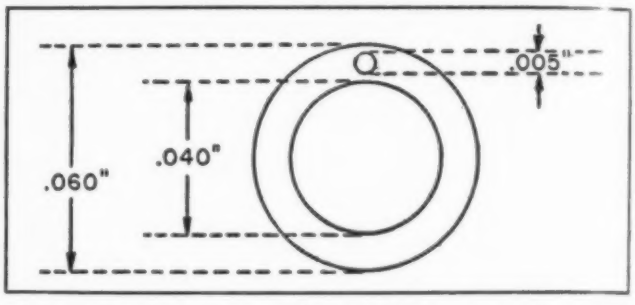


Fig. 3. Ferrite element produced by impact grinding. Business machine manufacturer has low reject rate in production of the parts.

Eliminating Edge Breaking By Ultrasonic Cutting

By **Burton B. Stuart**
Raytheon Manufacturing Company
Field Sales Administrator, Industrial Equipment

● The cutting and shaping of hard, brittle materials poses a big problem these days—especially to electronic component manufacturers, for example, who have to cut tiny discs from coated germanium or silicon for use in transistors, or square frames from ferrite wafers for computer memory devices.

The trouble in both cases involves disturbance of the material itself while the cut is being made—somewhat like an unanesthetized patient squirming under the surgeon's knife, spoiling a clean incision in a minor operation! Great care must be taken not to disturb the silicon or germanium anywhere along its surface except at the precise spot where the cut is made. At the same time, jagged edges or flow of the coating down over the edge of the base material must be avoided. In the case of ferrites, the problem is to produce the desired shape without allowing the ferrite crystal to crumble or crack in the process.

These conditions are easily met by the use of ultrasonic machining. The Raytheon impact grinders have a tool head of unusual design which is particularly suitable for these applications. The transducer and tool are supported by a parallelogram linkage having eight ball-bearing pivots, as shown in Fig. 1. This unique suspension maintains the axis of the transducer and cutting tool in a vertical position. The axis of vibration of the cutting tool is also vertical. The weight of the transducer is counterbalanced by an accurately calibrated spring, and a micrometer adjustment of this spring is provided to permit the net downward grinding force to be adjusted to any predetermined value, from a fraction of an ounce to as much as 18 lbs.

The parallelogram suspension is capable of movement, from the horizontal position shown, up to .050". When the machine is in actual use, however, the parallelogram is maintained very closely in the horizontal position by bringing the head (with the tool mounted on it) into juxtaposition with the work by means of the vertical feed.

As the tool cuts into the work, this feed is advanced. The dial indicator shows precisely any deviation of the suspension from the horizontal in the

vicinity of zero. Thus the parallelogram suspension arms are maintained horizontal, and lateral motion of the cutting head is prevented. Even when as much as 0.050" of vertical motion of the parallelogram suspension is allowed, the lateral motion of the cutting head cannot exceed ±0.00025". This method of suspension ensures that the desired preselected value of grinding force is always being exerted on the workpiece.

In the cutting of plated semiconductor dice and breakable ferrite crystals, this type of suspension provides the following advantages:
1. There is an almost complete absence of friction and sideplay. 2. Due to the design of the suspension, there is no possible loss of precision due to wearing action from stray abrasive particles. 3. Of greatest importance is the fact that the grinding pressure can be made infinitesimally small so as to minimize chipping, breakage, or upsetting of surface conditions. This force can be increased as desired in a completely stepless range to higher values during the cutting. It is therefore possible to start a cut with minimal grinding pressure and then increase the pressure for faster cutting action through the bulk of the material. When the tool approaches the lower surface and is about to "break through," the grinding force can be again reduced once more to minimize the tendency to chip or break.

The equipment affords large savings in the cutting of shapes and materials that are highly frangible. Substantial savings result due to sizable reduction in the number of rejects and the use of faster cutting rates through the body of the material, where the cutting operation is somewhat less delicate than at the surfaces.

A difficult ferrite cutting job accomplished by one of the country's foremost engineering institutions may be cited as a typical application study. This organization, while conducting electronic computer research, found it necessary to study domain patterns in ferrite. One of the requirements was the cutting of a 0.125" thick frame, Fig. 2. The sides of the frame had to be precisely oriented with respect to the lattice structure of the ferrite. Extremely sharp corners were essential as were clean, well-defined edges. At the same time, in order to ensure electrical continuity, the frame had to be made in one piece. Above all, no stresses could be permitted during the machining operation.

First, the ferrite was x-rayed and mounted on a glass slide, which in turn was mounted on a rectangular steel block in such a way that the orientation of the crystal structure with respect to the edges of the block was known. Next, the block was mounted on a rotary table which was rotated until one edge of the block was parallel to one face of the tool. With the crystal oriented in respect to the tool, the cut was started, using a low grinding force and a fine 600 grit abrasive slurry. After the initial surface breakthrough, the grinding force was somewhat increased. In two minutes a single-piece frame with perfectly defined edges had been produced.

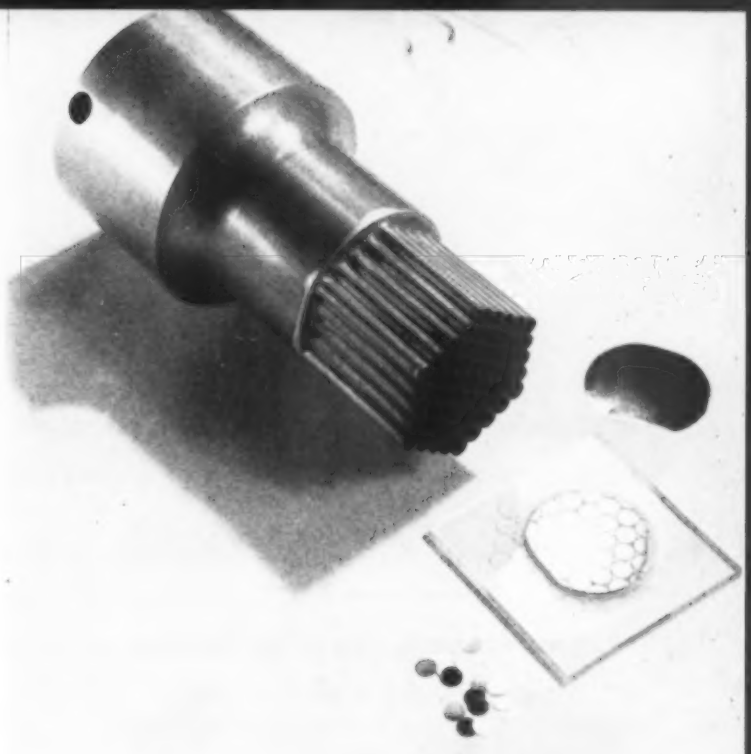


Fig. 4. Dicing tool and diced silicon wafer still fixed with resin to glass base plus wafers before mounting to glass base. Small silicon chips are shown in the lower portion of the picture after they have been removed from the glass base.

In another application, a leading manufacturer of business machines experienced considerable difficulty while working with other equipment in shaping ferrites. Using the Raytheon impact grinder, this delicate piece, Fig. 3, was easily produced in quantity. Reject rate was very low.

Several other prominent manufacturers of ferrite devices, who require precisely dimensioned torroidal and other shapes, are finding the impact grinder and its patented parallelogram suspension the answer to their production problems.

In the semiconductor field, the impact grinder is employed in production operations by some twenty-five leading manufacturers of semiconductor devices. An ever-increasing number of these devices are made from wafers of germanium or highly refined silicon which have been coated with extremely thin layers of metallic film—such as gold, lead, etc., Fig. 4.

Conventional dicing of coated wafers by diamond sawing tended to wrinkle the thin gold coating, to tear loose its bond from the wafer, to cold-flow the metallic film over the edge of the cut, or otherwise to disturb the delicate material structure. The impact grinder (in combination with properly formed tools and with a coated wafer properly mounted and prepared for cutting), provides perfect circular-shaped dicing. Large quantities of these dice are now formed on a routine basis in the fast-growing semiconductor industry. As losses due to unbonding or rough edges and other defects are kept to a minimum through the singularly advantageous design of the head unit, another manufacturing economy has been chalked up for ultrasonic impact grinding.

• • •

FILM REVIEW • • •

"ABRASIVE CUTTING"

- *Basic elements of abrasive cutting revealed.*
- *Dramatic illustration of speed of abrasive cutting through first film application of television X-ray system.*
- *Demonstration of coolant action through wheels by use of slow motion projection of high-speed camera shooting at 5,000 frames per second.*
- *Graphic description of various types of cutting machines.*
- *Prerequisites for abrasive cutting*

● This film developed by Allison-Campbell starts with a brief summary of the importance and development of abrasive cutting. This introduction is quickly followed by applications which include a very dramatic illustration of the speed of abrasive cutting through the use of X-ray motion picture studies conducted by the Allison Division with the cooperation of the X-ray department of General Electric Company.

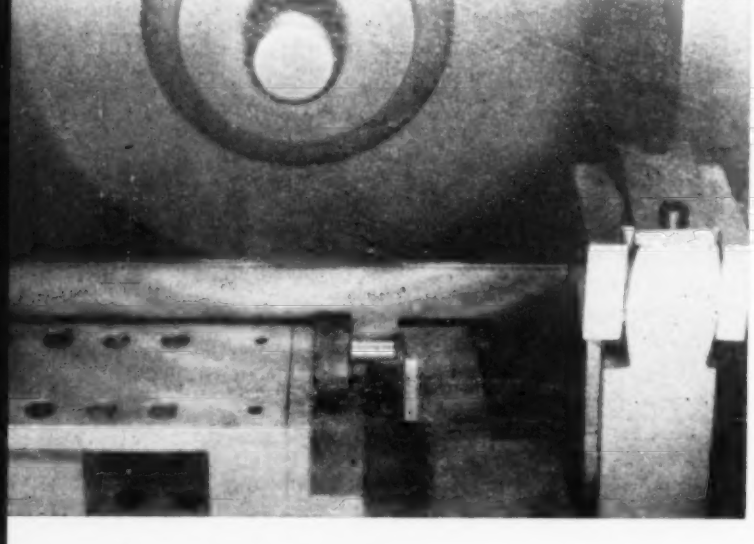
The use of G.E.'s television X-ray system which is marketed under the trade name of TVX is one of the first applications by industrial motion pictures. This is also the first time it has been possible to observe an abrasive cutting wheel inside the cut while severing a bar of metal. This particular application was the cutting of a 4" diameter bar of tool steel. The cut was completed in 70 seconds.

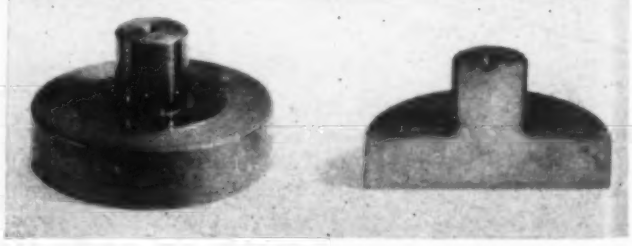
Other applications portrayed by this film are cutting mine bits from unannealed steel bars, metalographic specimens for checking depth of case hardening which can be checked by etching immediately after the cut and cutting hardened gear sections completely immersed in coolant.

Following the applications the film covers four basic types of machines. The chopstroke, oscillating, horizontal and rotary are all elaborated on. The film then covers the various methods of abrasive cutting, such as dry cutting and wet cutting. In the review of wet cutting operations the film was produced by a high speed camera shooting at 5,000 frames per second. The scene is of a wheel with radial holes to help carry coolant through the entire cutting area. This portion of the film has been slowed, the total slow motion sequence shown representing about 1/5 of a second of actual cutting time.

The close of this 20-minute film portrays the basic factors in obtaining the best results from abrasive cutting, such as machine selection, work holder, wheel guide, coolant application, wheel selection. • • •

Copies of this film are available at no charge to universities, schools, industrial plants and any organizations interested in abrasive techniques from Allison-Campbell Division, American Chain & Cable Co., Inc., Bridgeport 2, Conn.





At the left is a Rockwell hardness tester anvil which is etched for depth of case. At the right is the part after cutting on submerged type machine.

Tester anvil is shown here fixtured in submerged type abrasive cutting machine. Film included dramatic shots of submerged type cutting.

... wherever abrasive operations are performed

Questions and Answers

By **Arthur Rakestraw**

• How do man-made diamonds compare with natural diamonds in grinding efficiency?—W. J.—Pittsburgh

Rather exhaustive tests have indicated that man-made diamonds in resin and vitrified bond wheels for grinding cemented tungsten carbide showed a superiority over natural diamonds averaging approximately 35%. In some of the production grinding tests, man-made diamonds doubled the production of natural diamonds. In metal bonds, there appears to be little difference.

It should be borne in mind that man-made diamonds because they are not crushed, are somewhat rough and cinder-like, providing a good surface for the bond. Natural diamonds, on the other hand, though they are strong and rugged, have relatively smooth and glassy surfaces which are difficult to bond to the best advantage. Consequently, they often pull out of the wheel before they have done the full job.

At present, man-made diamonds are not recommended in grit sizes coarser than 100, nor for applications requiring heavy pressures and infeeds.

For further information, it is suggested that you contact the Metallurgical Department, General Electric Co., Detroit. •

• What are the characteristics of a good cleaner for barrel tumbling operations? —G. G.—Detroit

A suitable cleaner must possess properties that will enable it to hold in suspension such material as has been removed from the parts by abrasion, and not permit this material to be re-deposited on the parts. Tumbled parts must be clean and free from oxides after washing. The cleaner should not be a dermatitis hazard, but this is not always possible.

Several types of cleaners are employed in tumbling. Alkaline cleaners, such as soda ash or trisodium phosphate, soften the water and arrest oxidation or rusting on ferrous parts. They are also used to neutralize parts and tumbling media which have been subjected to acids. Acid cleaners are used to descale and remove oxidation from ferrous parts, brass and other metals, in lieu of pickling. Neutral cleaners are becoming increasingly popular because they can be used on practically all metals, reducing the need for many different containers in the tumbling room. •

• What is the meaning of the term "sfpm" applied to grinding wheels and how is it calculated?—S. K. Columbus, Ohio

The term "sfpm" is the abbreviation for surface feet per minute. It is the total distance, in feet, traveled by a point on the periphery of a grinding wheel in one minute. It is the speed of the actual working surface of the abrasive wheel.

The total distance traveled by a point on the periphery of a wheel, in one revolution, is equivalent to the circumference of the wheel. The circumference of a wheel is the product of its diameter and a factor, 3.1416, commonly known as pi. The circumference of a 24" diameter wheel is 24 x 3.1416, 75.3984 inches, or 6.2832 feet.

If the grinding spindle or wheel mount is designed to rotate at the rate of 1025 revolutions per minute, a point on the periphery of the grinding wheel would travel a total of 1025 x 6.2832 6440 feet, or 6440 sfpm.

Speeds indicated on abrasive wheels should not be exceeded as this figure represents the maximum permissible operating speed with a suitable factor of safety. •

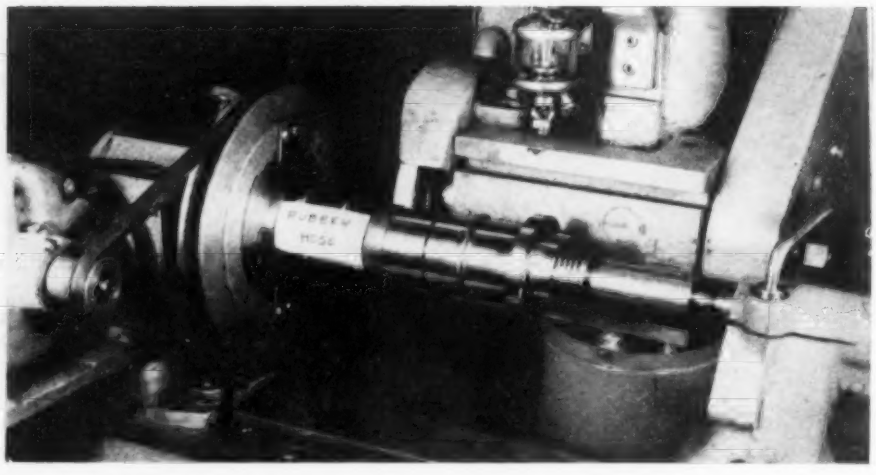
We've been asked . . . and Arthur Rakestraw has answered . . . quite a number of questions since "Q & A" was instituted a few months back.

But what's your problem in the use of abrasives? Whatever it is, chances are that other people have the same difficulty. So if you send your question in, you'll not only get it answered, but you'll be doing other readers a favor as well.

—The Editor

gf ... wherever abrasive operations are performed

SHOP HINTS AND KINKS



Stiff rubber hose set up as work driver on cylindrical grinder.

Rubber Hose Used as Work Driver in Cylindrical Grinder

By **H. J. Gerber**

● A short section of stiff rubber hose makes an efficient work driver on the cylindrical grinder. The hose section is placed between the end of the work and the headstock spindle nose of the grinding machine when the work is seated on centers.

This arrangement has proved to be much faster to set up than the usual method of clamping a dog on the work or on a mandrel on which the work is mounted.

Care must be taken to cut the hose to the length which will ensure accurate seating of the work on centers and yet contact the work tightly enough to turn it through frictional contact.

One application on which this driving method has proved to be of particular help is on jobs which must have the complete length of surface ground in one set-up, and which would be impossible to grind in that fashion if a dog were used on one end. The hose section, seated tightly between the end of the work and the spindle nose, permits traverse over the full length of the work. •

Make Full Use of Your Abrasive Belts

By **Charles G. Tuvek**

• It is customary to discard worn abrasive belts, but many of these belts have areas of almost untouched abrasive which is still usable. These strips of good abrasive can often be slit from the wider belt and used on narrow contours or on places which cannot be reached with the wider belts. Cloth belts can frequently be torn to the desired width once a slit has been started with a knife.

Salvaging belts in this fashion provides a source of supply for narrow widths which it would not otherwise be economical to stock.

When belts are slit in this fashion, it is a good idea to check and see that the direction of rotation is indicated on the salvaged portion, especially if it is to be used at the same speed as a new belt.

Strips salvaged from belts are also useful in finishing work on a bench lathe or similar equipment.

Hose set-up disassembled.

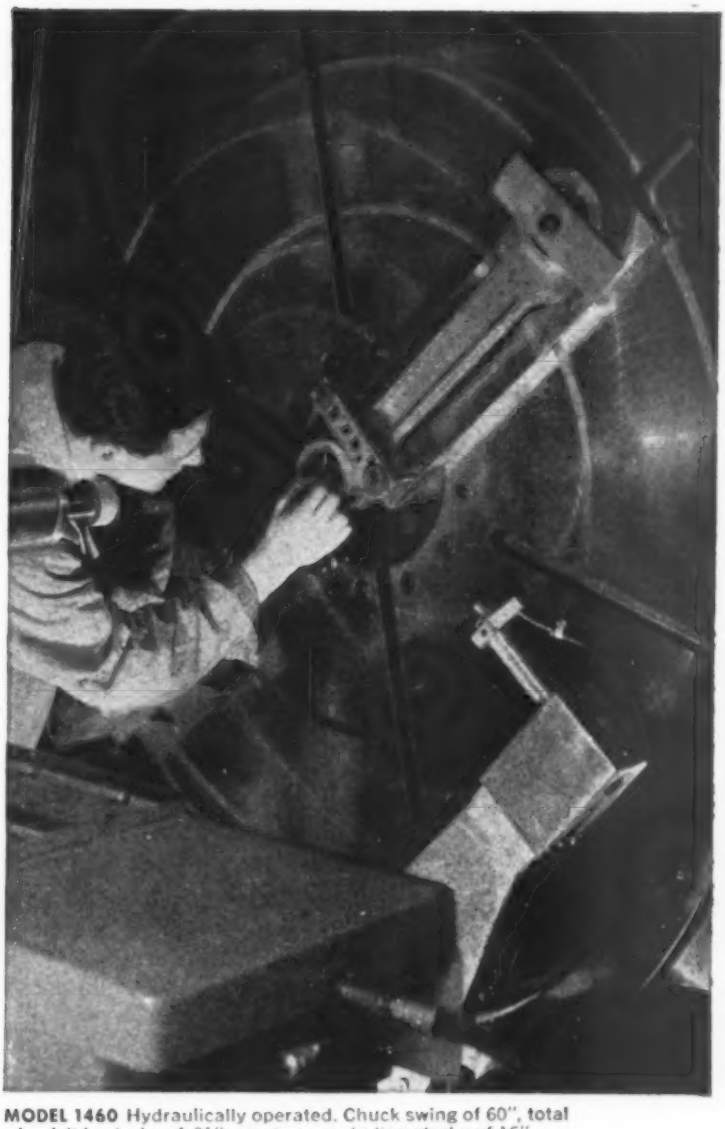
Do the **BIG** jobs . . .
and the small ones too
on a **BRYANT**

No matter what your internal grinding problem may be, it can be solved effectively with a Bryant Internal Grinder.

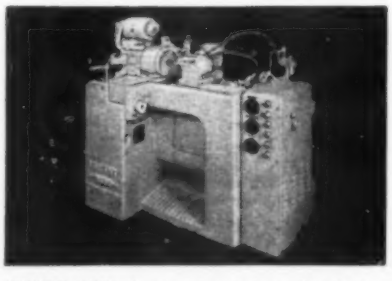
Bryant's great variety of manual, semi-automatic and automatic grinders is your assurance of a machine that is tailored to meet your production requirements.

Investigate how Bryant's engineering services can help you attain higher production at lower operating costs.

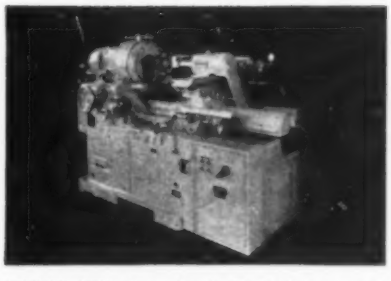
THE "CENTALIGN", completely new in concept and design, is ideal for the long run, high production grinding of straight bores, tapers and bearing raceways. Maximum swing, 10", grinding stroke, 1".



MODEL 1460 Hydraulically operated. Chuck swing of 60", total wheelslide stroke of 21"; maximum grinding stroke of 16".



MODEL 1109 A precision internal grinder, suitable for covering the range of smaller bore sizes. Total swing of 9"; maximum grinding stroke of 3½".



MODEL 1116 Tops for both toolroom and general production work. Total chuck swing 16"; maximum grinding stroke 8".

MODEL 1316-J Hydraulic Internal Grinder. For combined bore and face grinding. Two wheelheads on a single wheelslide provide exceptional speed, accuracy and versatility. Maximum swing, 16", maximum grinding stroke, 8".

BRYANT Chucking Grinder Co.

85 CLINTON STREET, SPRINGFIELD, VERMONT

Offices: Indianapolis • Cleveland • Chicago • Detroit • Mt. Vernon, N. Y. • Philadelphia

Internal Grinders • Internal & External Thread Gages • Granite Surface Plates • Magnetic Drums for Computers • Special Machinery

Left to right: (standing, center of photograph) Russ Holm, Divisional Engineer, Mattison Machine Works; Morrey Patterson, Managing Editor of Hitchcock's Grinding and Finishing and Bill Knapp, Sales Manager of Mattison Machine Works, Rockford, Illinois, are shown at one of the classroom sessions of the Mattison monthly 3-day "Surface Grinding" School for their representatives and customers.

THE MAN FROM HITCHCOCK

Here we see a graphic example of your "Man from Hitchcock" in action. Although Morrey Patterson, Managing Editor of Grinding and Finishing—the industry's only publication devoted to abrasive processes in the metalworking industry, maintains an extremely busy investigating and writing schedule, we see him here offering a valuable counseling service for the Mattison Machine Works "Surface Grinding" School. This school not only helps the Mattison representatives better serve their customers, but also teaches the attending customers about the latest grinding machinery and abrasive developments and how these processes may be adapted to their grinding problems to provide greater production efficiency.

Providing specialized technical information to the metalworking, woodworking and mass transportation industries has been Hitchcock's prime purpose since 1898. This is accomplished in many ways . . . one of the most important is the dissemination of the latest news, trends, principles and standards of industry through Hitchcock publications . . . long recognized as the authoritative source in their various fields. Providing specialized technical training to industry is also another important Hitchcock service . . . a good example is the Fluid Power Training Program — "Installation, Operation and Maintenance of Fluid Power Equipment"* —recently introduced at the request of industry. This program, the first and only of its type, has been acclaimed as providing industry with an "answer" to their "need" for trained, qualified fluid power personnel.

If you sell to the metalworking, woodworking or mass transportation industries, Hitchcock publications offer circulatory quality and top readership, due to editorial superiority, that will pay off in solid, business-building results! Call your "Man from Hitchcock" and take advantage of his services.

*For information on this program, write to the Industrial Services Division of Hitchcock Publishing Company.

METALWORKING

Machine & Tool Blue Book
Machine & Tool Directory
Grinding and Finishing
Carbide Engineering

WOODWORKING

Hitchcock's Wood Working Digest
Hitchcock's Wood Working Directory

TRANSPORTATION

Mass Transportation
Mass Transportation's Directory
School Bus Trends

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SINCE 1898

THE PIONEER OF CONTROLLED CIRCULATION

... wherever abrasive operations are performed

Free Literature

Use the postpaid card opposite page 64 to receive your copy of any of the literature listed on these pages. Just circle the proper number on the card which coincides with the number which precedes the paragraph. We'll do the rest.

(See Number 1)

(See Number 2)

(See Number 3)

1. "American" Grinding Wheels are made in every size and shape and for purposes as grinding all metals, as well as such non-metals as cork, rubber, linoleum, leather, fire brick, among other items, according to brochure. The manufacturer is able to recommend the exact wheel specifications for customers' needs. All wheels are tested on the latest equipment for true running qualities, strength and balance. Among the wheels discussed are general purpose wheels for offhand grinding of drills, chisels, lathe and planer tools, etc.; portable tool wheels for cutting off, snagging, and cleaning of parts; surface grinding wheels for the grinding of flat surfaces, and cylindrical and centerless grinding wheels for grinding the outside diameters of a revolving piece. The American Emery Wheel Works, Providence, R.I.

2. Abrasive Belt Machinery. Defined in recent catalog is the Model T-G 168 tube grinder, developed for grinding internal seams, welds, etc., on tubular products, which quickly removes and deburrs objectionable particles in preparation for paint, plating, glass lining or for general appearances. The yoke sanders feature automatic belt tension arms adjustable for vertical, horizontal or angular positioning, and the units are floor, wall or bench mounted. Swing and table tongue sanders are described, as well as a glass seaming belt grinder. Bush Manufacturing Co., Clawson, Mich.

3. Filtration of Coolants, Lubricants and Hydraulics. "12 Avenues to Metalworking Cost Reduction" is the title of brochure dealing with the Alsop method of Sub-Micron filtration. Preselection of the degree of filtration required is accomplished by providing filtering media in ten sizes of particle retention in graduated stages from 20/25 down to 0 microns. Elongated particles cannot penetrate the filter barriers because of the depth of the filter medium. Areas of cost reduction said to be possible with this method are improved finish and controlled accuracy of workpiece, reduction of coolant waste, and longer tool or abrasive wheel life expectancy. Alsop Engineering Corporation, 58 Aster St., Milldale, Conn.

4. "Crush Trued Wheels Cut Machining Costs on Many Profile Shapes" is the first article in the "Report From Cincinnati Milling." The pages contain descriptions of a number of new developments of interest to metalworking executives. Machines of new and improved design can replace obsolete equipment. Discussed in articles is the new Cincinnati Filmatic No. 2 surface grinding machine and the new 10" production universal grinder. The Cincinnati Milling Machine Co. and Cincinnati Grinders, Inc., 4701 Marburg Ave., Cincinnati, Ohio.

5. A Buffing catalog is offered which covers heavy duty buffing lathes, bench model buffing lathes, buffing wheels, buffing hoods, buffing compounds, among other items concerning buffing. Complete price lists, up to date, make it easy to order. H. W. Kramer Co., Inc., 120-30 Jamaica Ave., Richmond Hill, N.Y.

6. Internal Visual Inspection Instruments. The line of precision-made borescopes, ranging in size from a few inches to more than 60' in length, is illustrated and described in a two-color folder. The borescopes are designed for more rapid inspection of blind rivets, parts, propellers, blades, bores, forgings, castings, and machined parts. The three most commonly used Lenox interchangeable viewing heads are described. They are said to be designed so that ultra-violet light can be incorporated in their construction for Magnaflux inspection. In addition, mercury vapor lamps can be used, and when the borescopes are used in the presence of acid, water or oil, they are sealed to prevent damage to the instruments. Lenox Instrument Co., 2012 Chancellor St., Philadelphia 3, Pa.

7. Protective Clothing. AC Silvabestos clothing is said to offer unusual abrasion resistance of up to 168%, and 40% heat reflection, according to flyer. Great tensile strength and strong seams, as well as not readily absorbing oil and grease, are features claimed for the clothing. Mittens, coats, leggings and pants are some of the asbestos clothing offered by the Safety Products Division, American Optical Co., Southbridge, Mass.

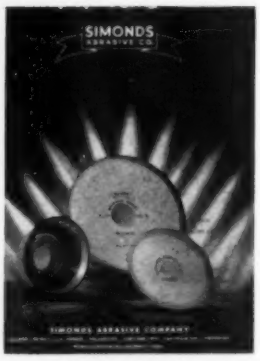
8. Truforming Grinders, type B and C, are described in 8-page catalog, T558. Drawings illustrate how Truforming works and eight case histories of typical jobs accomplished by Truforming are included. Auxiliary equipment and specifications are listed. The Thompson Grinder Co., Springfield, Ohio.

9. Bactericide for the treatment of and protection against rancid cutting fluids is discussed in brochure available. The Cimcool Bactericide "09" Wafers will not cause skin irritation, and are safe because they do not contain any alkali, according to the announcement. These concentrates are recommended to eliminate coolant sump odors, as they contain bactericides sufficient to inhibit the growth of bacteria for long periods under normal conditions. Cincinnati Milling Products Division, The Cincinnati Milling Machine Co., 4701 Marburg Ave., Cincinnati 9, Ohio.

10. "Diamond Wheels and Hones" is the title of catalog, Form ESA-299, containing consumer net prices for man-made diamond wheels in resinoid and vitrified

FREE LITERATURE *continued*

(See Number 9)



(See Number 10)

(See Number 12)

bonds, and natural diamond wheels in metal bond. The line includes all standard sizes and shapes, diamond depths, concentrations and grain and grade specifications of resinoid and vitrified bonded wheels made from man-made diamonds. Simonds Abrasive Co., Tacony & Fraley Sts., Phila. 37, Pa.

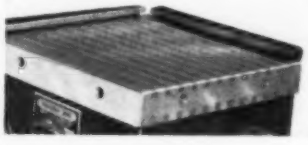
WHY *Robbins* IS YOUR BEST BUY

Only Robbins angular tooling equipment assures you positive accuracy when setting up to machine, grind or inspect angular work . . . because only Robbins gives you these exclusive features:

POSITIVE LOCKING locks firmly inside sine bar roll with expanding action for positive lock. Screw at each end locks toward front of unit, always pulls upper member firmly down on gage block without distortion. (Pat. app. for)

"PERMA-FLAT" SWIVEL BLOCK contacts gage block over entire face of swivel block instead of on a single thin line of contact. This patented feature provides greater contact between gage block and unit . . . combines with Robbins positive locking to assure the utmost accuracy.

FINE POLE ceramic magnet chuck, manufactured for Robbins by famed O.S. Walker Company, Inc. Strongest magnetic chuck available. Fine poles make it easier to set up smaller work, go right to the edge for easier setup next to rails.



IN ADDITION, both magnetic and non-magnetic models are built with ribbed base, intermediate and top plates for distortion-free strength and rigidity, with full-length ground roll seats for precision location, greater accuracy. All models make it possible to set up any angular work in just four simple steps . . . in minutes instead of hours! Before you purchase any sine plate, be sure you check Robbins' exclusive features. Write for new catalog!

OMER E. *Robbins* COMPANY
11961 DIXIE AVENUE DEPT. G DETROIT 39, MICH.

11. Automatic Polishing and Buffing Machine. The introductory section of the 16-page catalog discusses the basic factors to consider when selecting one of seven types of straight-line machines developed to suit a wide variety of part requirements in low, medium and high production ranges. Design features, operating descriptions, typical applications and machine illustrations are given on the seven types. Reciprocating, fixture-return, horizontal-return, over-and-under, rectangular, universal and rotary-conveyor types are treated. Six types of standard adjustable lathes to be used with the polishing machines are described. Acme Manufacturing Co., 1400 E. 9 Mile Rd., Detroit 20, Mich.

12. Dial Indicators. Twelve-page catalog D, on the expanded line of Em-re dial indicators, is now available. It describes and illustrates this line covering all four A.G.D. groups. There are ten ranges from .002" to 1.000" with graduations in .001", .0005", .00025", .0001" and .00005". In addition, the Golden Em-re dial indicators, with fine limits of accuracy, are described, as well as the service kits for A.G.D. group 2 dial indicators. Petz-Emery Inc., Pleasant Valley, N.Y.

13. High Vacuum Valves. The Stokes Series ST gate type high vacuum valves, discussed in data sheet 571, feature full-opening design with straight-through unrestricted flow, and a very short flow path which results in maximum conductance. The compact construction saves installation space. The actuating mechanism for seating the valve plate is said to insure a vacuum tight seal against atmospheric pressure in either direction. Sizes now available are 2", 3", 4", and 6" in both manual and air-operated versions; 8" and larger sizes in the air-operated form only. Vacuum Equipment Division, F. J. Stokes Corp., 5500 Tabor Rd., Phila. 20, Pa.

14. Buffing and Polishing Machinery. Brochure available describes the Divine circuit conveyor with head units, which permits automatic buffing of many items which would otherwise be hand-buffed. On the Job-O-Matic Jr. work table with chain chuck and variable speed drive, finishing operations which previously took only 20 minutes are now performed in one minute on steel tops for water coolers. Featured also are an abrasive belt head, single stage automatic buffing machine, VR lathe for bench or pedestal mounting, and other buffing and polishing machinery. Divine Bros. Co., 200 Seward Ave., Utica 1, N.Y.

15. Barrel Finishing. Bulletin No. 158 describes the full line of Lorco equipment for precision barrel finishing. This includes conventional horizontal octagonal barrels in capacities ranging from 0.7 to 36.6 cu. ft. and the new Lorco vibrator in capacities of 12.70 and 17.50 cu. ft. It employs the concept of controlled vibration through variable frequency and amplitude. Other equipment described and pictured includes a mechanized screen to separate work and chips, chip bins, hoist pans, etc. Lord Chemical Corp., 2068 So. Queen St., York, Pa.

16. Power Sweepers, Models 705 and 706, are discussed in flyer obtainable. There is no dust bag to empty, as fine dust is deposited directly into the hopper. A 15 cu. ft. hopper capacity means less dumping time. A vacuum cleaning attachment cleans bins, shelves, and hard-to-reach spots. Wayne Manufacturing Co., 1275 East Lexington St., Pomona, Calif.

17. A 55-page Magnesium Tooling Plate shop manual is the first of its kind for magnesium tooling plate, a product introduced by Dow in 1954. Subjects covered are magnesium tooling plate properties, use of magnesium extrusions in tooling, shop characteristics of magnesium alloys, machining instructions, grinding and polishing, joining, inserts and bushings, surface protection and good shop practices. Magnesium Department, The Dow Chemical Co., Midland, Mich.

18. "Tooling for Metal Powder Parts," 253-page book, is a comprehensive reference work covering the relatively new process of making metal parts by compressing metal powders into finished or nearly finished form. Written by George H. DeGroat, Associate Editor, **American Machinist,** the book is a practical treatment on modern practice in the process planning, tool design, equipment and operations involved in producing structural parts from various metal powders. American Society of Tool Engineers, 10700 Puritan Ave., Detroit 38, Mich.

19. Barrel Finishing Machine. Supersheen Model EB-3032, as discussed in flyer, has a 30" diameter x 32" long barrel for finishing small parts, as well as fast action on large castings and forgings. Total barrel capacity of 13.8 cu. ft. or 1,000 lbs. can be divided into two compartments if desired. A variable speed control allows adjustment of barrel rotation speed from 10 to 30 rpm. A positive magnetic brake and forwarding and reversing switch permit easy positioning of the barrel. Neoprene lining prevents wear, and cushions certain types of parts. ALMCO, Queen Products, Inc., Albert Lea, Minn.

20. Enclosed Pancake Motors are discussed in Bulletin No. 2100, which presents full engineering information on these flange type motors of conventional radial air-gap design. They are intended for use on machine tools, roof-ventilating fans and other space-cramped applications. The motors are of rugged cast iron construction, with factory lubricated bearings. They are offered in ratings from 1 to 15 hp. In ratings up to $1\frac{1}{2}$ hp their construction is non-ventilated; above that rating they are fan-cooled. The Louis Allis Co., 427 E. Stewart St., Milwaukee 1, Wis.

21. Air Conditioning Units. Bulletin No. 786 describes the new line of AAF-Herman Nelson air conditioning units. One of the features offered is the Roll-O-Vent automatic air filter, which is reported to assure constant air delivery at all times, and make filter changing automatic. Standard accessories available are given, as well as steps in selection of the basic unit and components, capacities, standard arrangements, dimensions, and suggested specifications. American Air Filter Co., Inc., 215 Central Ave., Louisville 8, Ky.

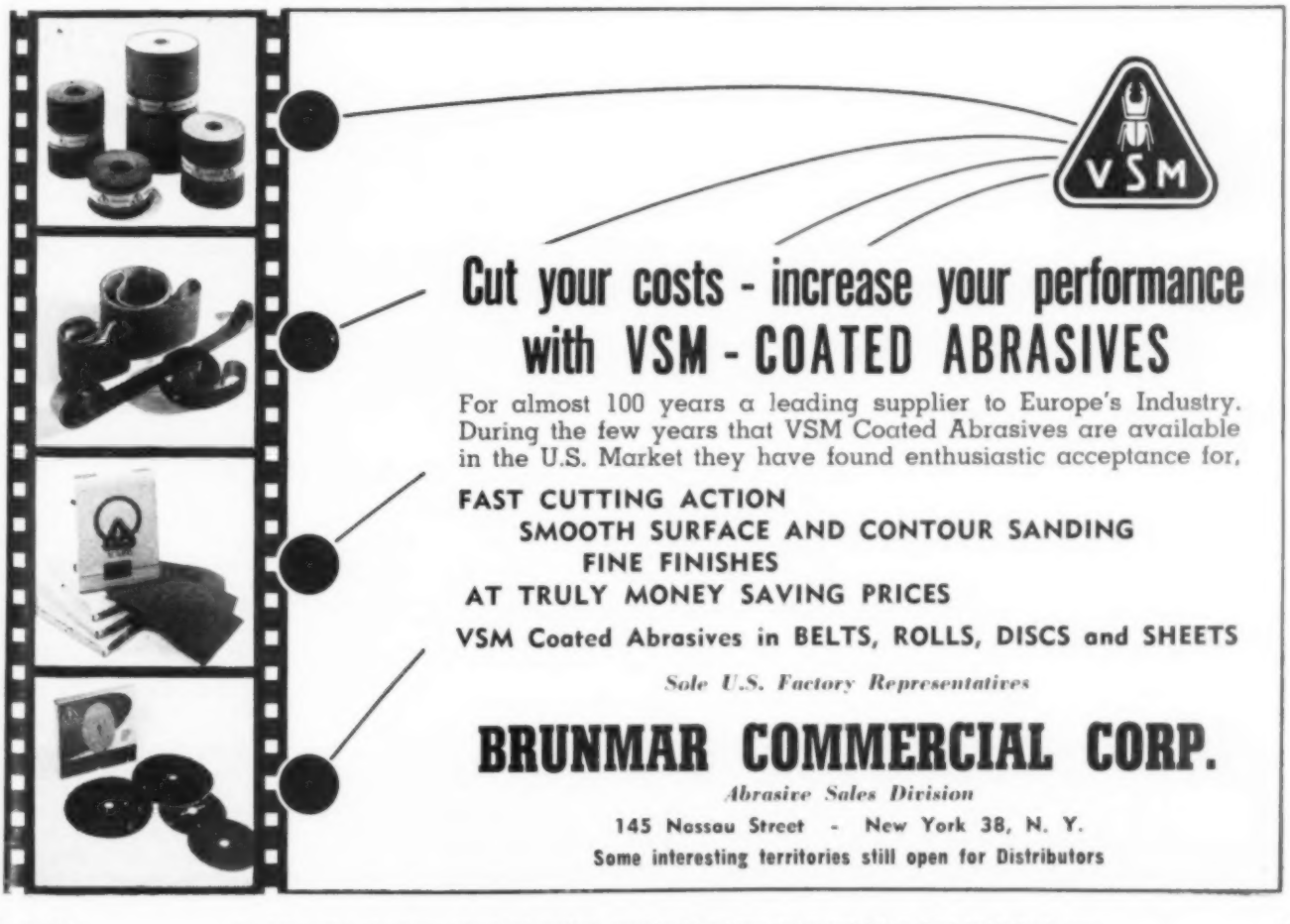
22. Filters for Aircraft, Industrial and Ground Support Equipment are described in 132-page profusely-illustrated manual. Filters for lubricating oils, gasoline, jet fuels, hydraulic fluids, compressed air, gases, de-icing fluids, air conditioning systems, test stands and refueling installations are described and illustrated in detail in the product section. Engineering specifications, including components and parts numbers, flow curves, capacities and sizes, exploded views and cross-section drawings, are given for the nearly thirty different types of filters and filter elements discussed. Bendix Filter Division, Bendix Aviation Corp., 434 W. 12 Mile Rd., Madison Heights, Mich.

23. Ten Intensive Courses in Industrial Engineering are offered by Washington University, September 8 through September 19. The courses are intended for personnel desiring basic and introductory information in the area of interest. Catalog available gives information as to enrollment, where the intensive courses will be held, and the cost. Description of the

(See Number 13)

(See Number 19)

(See Number 20)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Some interesting territories still open for Distributors

Why MICROHONING AT EVINRUDE trims costs . . . booms productivity . . . eliminates operations...improves quality

Evinrude Motors, Division of Outboard Marine Corporation, has replaced with Microhoning their former method of processing conn bores. Here's why:

MICROHONING INCREASES PRODUCTIVE CAPACITY 23 TIMES

Before Microhoning equipment was installed, Evinrude used diamond boring on wristpin and crankpin bores. Now! A per-man productivity comparison of the two processes shows: diamond boring, 300 rods in 40 hours; *Microhoning, 7,000 rods in 40 hours.*

Shown to the left is one of two lines of Microhoners. Each machine has: Microdial automatic stone-feed and stone-wear compensation; automatic stone-wear indicator; and Microsize Gage Ring automatic sizing control.

REDUCES OPERATIONS

Greatest cost-cutting contribution made by Microhoning is *elimination of three former operations:*

1. Re-milling locating faces of wristpin bores.
2. Straightening of rods after boring.
3. Milling oil hole grooves in wristpin bores.

ELIMINATES BRONZE INSERTS

The functional surface characteristics of Microhoned rod bores preclude the need for bronze bushings or shoes. Based on current production schedules, *the cost of millions of bronze inserts will be saved this year.*

ASSURES FEWER REJECTS

From a Microhoning run of 62,000, receiving 100% inspection on an air gage, only 200 rods required reprocessing. *This is a rejection rate of only 3/10 of 1%.*

IMPROVES PRODUCT QUALITY

Microhoning is a low-velocity abrading process that leaves bore surfaces free of torn, smeared or burned metal. Benefit: *Rods that have precise, longer wearing bores.*

To learn more of why Microhoning provides efficient stock removal, closer tolerances and functional surfaces, write to:

MICROMATIC HONE CORP.
8100 SCHOOLCRAFT AVENUE · DETROIT 38, MICHIGAN

FREE LITERATURE *continued*

courses offered is also given. Washington University, University College, St. Louis 5, Mo.

(See Number 21)

24. Precision Made Rotary Table. The Roto-Grind precision grinding fixture is described in folder available. It is said to reduce grinding time 500%, and grind tolerances within 50 millionths. The unit is engineered to fit the jig grinder and to handle large or small diameters. Specifications are included, with its value for external and internal grinding. The M-M Check described is not only a checking fixture, but can be used as a grinding fixture for grinding any combination of slots, squares, hexagon, etc. M & M Tool & Mfg. Co., Dayton, Ohio.

(See Number 22)

25. Coolant Service Pump has a positive displacement pump, and pumps one gallon every 4.7 seconds of grit, metal chips and sludge, according to flyer available. It is designed and engineered for quick and easy emptying of coolant tanks. Associated Engineers, Inc., Box 1628, Springfield, Mass.

26. A Mist Coolant Unit is described and illustrated in Bulletin F-7 now offered. Eight photographs show how "Spraymist" is of value in increasing tool life in boring, grinding, milling, tapping, sawing and turning operations. The unit includes air filter, trap, regulator and gauge, solenoid valve and conduit box, pressurized coolant reservoir and filter. Also contained is information on Spraymist Jets with "tip end" atomizing, method of branching from existing lines, elimination of siphon-lift problems. Bijur Lubricating Corp., 151 W. Passaic St., Rochelle Park, N.J.

27. "Micro Tips No. 25" is a how-others-do-it publication containing ideas submitted by plant engineers and electricians showing how they've used snap-action switches to increase production efficiency. Illustrated by drawings and photographs, the issue contains six methods which can

save man-hours, protect operators and machinery, and eliminate waste. The lead story describes how a manufacturer has automated a forming and adjusting machine by use of 25 snap-action switches of six different types. Micro Switch, Div. of Minneapolis-Honeywell Regulator, Freeport, Ill.

(See Number 24)

28. Torque Motors. Bulletin T-1 describes the Peerless line of torque motors, gives general applications, discusses ratings, frame sizes and special torque motors, and gives a recommended list of conditions to consider in selecting torque motors. Typical uses and motors are shown. Peerless Electric Co., Motor Division, Warren, Ohio.

(See Number 26)

29. Mineral Industries. Form 18-50 contains an order form for the final volumes from the 1954 Census of Mineral Industries. U.S. Department of Commerce field offices are listed. Summary, industry and area statistics are also included. Supt. of Documents, U.S. Government Printing Office, Washington 25, D.C.

30. "Sandpaper Sense" is the title of a magazine offered as a service to users and distributors of abrasive products. In pictures and text, new methods, new products and new services within the industry are discussed. The first article describes the process of making furniture at The Vilas Furniture Co., with the sanding equipment and use of the Vila-Seal finish outlined. The Questions and Answers section concerns abrasives and backings used for making sandpaper. Canada Sand Papers Ltd., Plattsville, Ont., Can.

Do you have any kinks which would be helpful to the next fellow? Send them to GRINDING and FINISHING for publication. All material is paid for! Material can be in your own words, drawings can be rough pencil sketches; our editorial and art departments will do the rest. Send your Hints and Kinks to: Editor, GRINDING and FINISHING, 222 E. Willow Ave., Wheaton, Ill.

How MICROHONING AT EVINRUDE trims costs . . . booms productivity . . . eliminates operations...improves quality

By installing Microhoning equipment to process wristpin and crankpin bores in conn rods, Evinrude Motors, Division of Outboard Marine Corporation, realized considerable savings. The following comparison with previously used diamond boring shows how Microhoning cut time, materials and costs:

MICROHONING BOOSTS PRODUCTIVE CAPACITY 23 TIMES

Diamond Boring Production Per Man: 300 rods in 40 hours.

Microhoning Production Per Man: 7,000 rods in 40 hours.

Several rod sizes are Microhoned on the same equipment — bore diameters range from .874" to 1.500", bore lengths from .815" to 1.011". Microhoning removes .005" stock from wristpin bores in about 24 seconds (floor-to-floor) and generates a controlled finish of 25 to 30 microinches as specified. On crankpin bores, Microhoning removes .0005" stock to generate specified finish of 3-5 microinches in 17 seconds (F-T-F). Tolerances on both bores are held to .0001" for roundness and straightness, and .0004" on diameter.

Close-up of double unit Microhoner shows operator checking a wristpin bore on air gage. Microdial, which automatically compensates for abrasive wear, is shown in center of photo.

ELIMINATES THREE OPERATIONS

1. Former re-milling of locating face on wristpin bore is eliminated — *Microhoning's float principle maintains original bore location.*

2. Straightening after rough boring is no longer required — *Microhoning tool follows neutral axis of bore.*

3. Milling oil hole grooves in wristpin bores is eliminated — *Microhoning generates a cross-hatch pattern that provides built-in oil reservoirs.*

SAVES COST OF MILLIONS OF BRONZE INSERTS PER YEAR

Microhoning's low-velocity abrading, with efficient cutting over a wide area, produces surfaces free of torn, smeared or burned metal.

Result: Precise bores having surfaces that resist galling and flaking.

Benefit: User obtains longer wearing rod bores and a functional supplanting of bronze inserts.

For further information on Microhoning process or to receive movie "Progress in Precision", write to:

MICROMATIC HONE CORP.
8100 SCHOOLCRAFT AVENUE • DETROIT 38, MICHIGAN

A Hitchcock conclusion:

Industry needs to know more about ASSEMBLY and FASTENER ENGINEERING

ENGINEERING
assembly and fastener
devoted to CREATIVE APPLICATIONS in assembling and fastening the products of American Industry
... so now, a new Hitchcock monthly publication to serve a 1.4 billion dollar industry!

Three years ago your men from Hitchcock started a conversation which ran something like this:

Everything from automobiles through zithers have to be held together.

How much of the cost of making things is devoted to their assembly and fastening?

How many manufacturers use a creatively engineered fastener for their specific application?

How many buy fasteners on the basis of assembly cost and not on piece-part cost?

In short, what steps have manufacturers taken to reduce their assembly and fastening costs?

The seed had been planted . . . Hitchcock had been noticing that the field of assembly and fastening throughout industry had been virtually ignored.
After three years of study and research, the idea germinated into a few basic premises . . .

- **50-75% of total manufacturing cost goes into assembly and fastening operations.**
- **There are several ways to reduce this cost.**
- **Industry should be shown HOW.**
- **There is no publication at present devoted to the little-noticed field of assembly and fastening.**

The Hitchcock conclusion: a new monthly publication—ASSEMBLY and FASTENER ENGINEERING—to reach every major portion of this $1,400,000,000.00 market. To stress creative applications . . . discuss new methods . . . to EDUCATE MANUFACTURERS in decreasing assembly and fastening costs, in increasing profits.
CIRCULATION: in excess of 25,000 copies at the outset.
READERS: on the engineering level; will include design, process, method, production, manufacturing and standards engineers.
FIRST ISSUE: October 1958.
Plan now to advertise in the ONLY publication which can and will serve the important and growing assembly and fastener market. Write, telephone, or wire for further facts on ASSEMBLY AND FASTENER ENGINEERING.

METALWORKING

Machine & Tool Blue Book
Machine & Tool Directory
Grinding and Finishing
Carbide Engineering

WOODWORKING

Hitchcock's Wood Working
Hitchcock's Wood Working Directory

TRANSPORTATION

Mass Transportation
Mass Transportation's Directory
School Bus Trends

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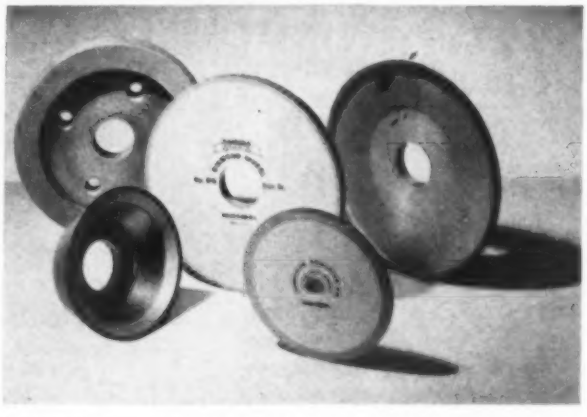
PUBLISHING COMPANY
WHEATON, ILLINOIS
SINCE 1898

THE PIONEER OF CONTROLLED CIRCULATION

New Equipment and Materials

For further information on any of the products listed here, use the handy postpaid card opposite page 72.

Man-Made Diamonds in Grinding Wheels Increase Grinding Efficiency by 35%



An increase of grinding efficiency up to 35% is claimed for the new line of diamond grinding wheels, featuring the new man-made diamonds.

The manufacturer has a complete line of all standard sizes and shapes, diamond depths, concentrations and grain and grade specifications of resinoid and vitrified bonded wheels made from man-made diamonds. Metal bonded wheels are furnished with natural diamonds; and resinoid and vitrified bonded wheels may also be supplied with natural diamonds, if desired.

Man-made diamonds provide increased grinding efficiency, especially in resinoid bonded wheels for grinding the very hard cemented carbides.

Simonds Abrasive Co., Tacony & Fraley Sts., Phila. 37, Pa.

Use postpaid card. Circle No. 101

Long Handled Sander for Quick Manipulation

Designed for fine finishing of either flat or contour surfaces, Model 500-V vertical pneumatic sander has been particularly developed for feather-edge sanding and fine metal finishing.

The smooth-running motor is quiet and vibration free. The thumb-operated throttle assures positive control, and double lugs permit easy, instantaneous on-off movement using only the thumb, according to the announcement. The unit may be used with a 5" or 7" sanding disc.

Airetool Mfg. Co., Springfield, Ohio.

Use postpaid card. Circle No. 103

Spark-Deposition to Improve Tool Life

The introduction of the Sparcard machine by Impregnated Diamond Products Ltd., Gloucester, is a means of producing the desirable combination of qualities by deposition of tungsten carbide on the surface of other tool materials. The machine is a spark unit similar to the Sparcatron except that, instead of removing metal from the workpiece, metal is transferred from the electrode to the work surface.

The main differences between the new machine and that for spark erosion lie in the circuitry and the replacement of the servo feed with a vibrator. The vibrator, situated immediately below the machine head, has a clamp for electrodes which are usually tungsten carbide. Capacity for milling cutters is up to 8" diameter.

The actual treatment comprises deposition of a fine surface of the electrode material on the tool surface subject to the greatest wear.

Easco Products Co., P.O. Box 587, Ypsilanti, Mich.

Use postpaid card. Circle No. 102

Rotary Table Grinds Tolerances Within .000050

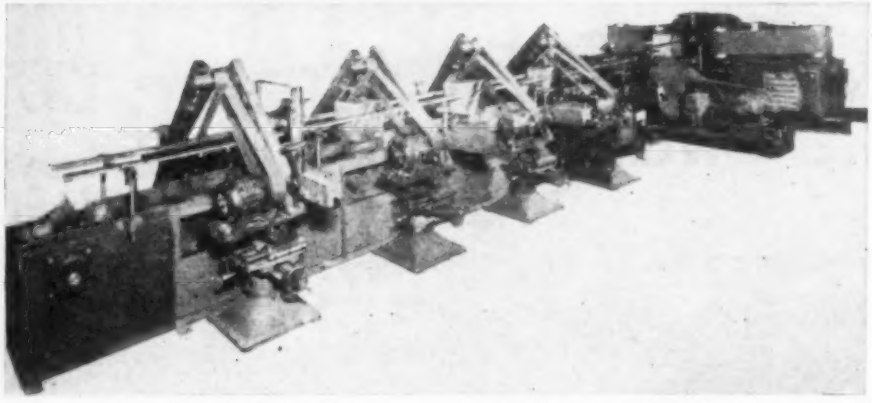
The Roto Grind, a precision made rotary table, is said to reduce grinding time as much as 500%. This grinding fixture, with 10" table motorized, grinds tolerances within 50 millionths with little effort, according to the manufacturer. The table turns under the wheel.

The fixture is designed to fit a jig grinder, and to handle large or small diameters. It gives fast external and internal grinding.

M-M Tool Mfg. Co., Dayton 2, Ohio.

Use postpaid card. Circle No. 104

Billet Grinder Has Four Chamfering Units On Each Side



The billet grinder is designed to remove heavy saw marks and all sharp projections from aluminum billets forged into engine cylinder heads.

The billets are loaded at one end of the machine from where they are carried on a conveyor between two abrasive belts which grind the sides of the billets. They are then carried down to the lower level or supplementary conveyor of the chamfering units where tripping devices index each billet 90° between each pair of chamfering units.

The abrasive belt chamfering units consist of a system of two pulleys over which run an abrasive belt. The belt system is, in turn, mounted on a fulcrum with adjustment and counterweight to position and hold the belt for chamfering various angles. The machine has four chamfering units on each side.

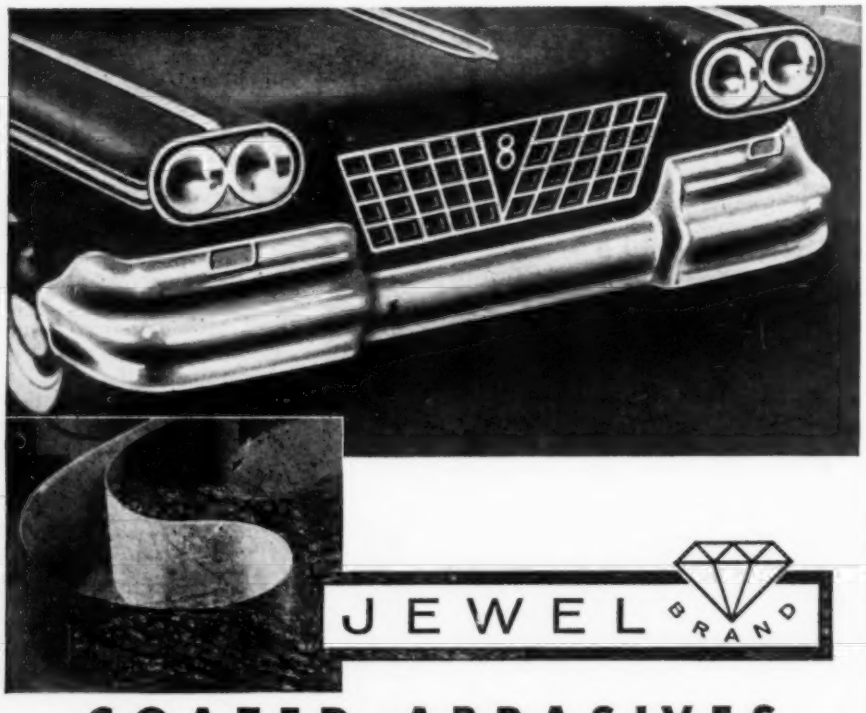
The advantages claimed for the grinder are uniform quality, speed, and ease of automatic handling, as the machine can process close to 150 billets an hour as compared to 12-15 previously handled by hand.

Divine Brothers Co., Seward Ave., Utica, N.Y.

Use postpaid card. Circle No. 105

For the finishing touch that means so much!

From high-powered automobiles to high-flying jet engine parts, Jewel Brand Coated Abrasives are bringing fast, economical grinding, smoothing and polishing methods to the manufacture of hundreds of precision products. It will pay you to bring their many advantages to bear on your finishing problems. Remember . . . end products **cost less** when you finish with Jewel Brand Abrasives. Order from your Industrial Distributor or write us for help with special applications.



JEWEL BRAND

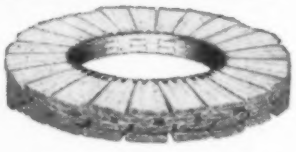
COATED ABRASIVES

Belts • Rolls • Sheets • Discs • Specialties

ABRASIVE PRODUCTS, INC.

South Braintree 85, Massachusetts

Soft Treatment For Cotton or Sisal Buffs



A new "soft" treatment, which lubricates and softens cotton or Sisal buffs, is said to produce a super-flexible texture which readily penetrates crevices, recesses and grooves, and uniformly follows every contour for faster, thorough finishing.

American Buff Co., 2414 S. LaSalle St., Chicago 16, Ill.

Use postpaid card. Circle No. 106

Dial Bore Gage Needs Limited Clearance

The right angle dial bore gage needs but a minimum amount of space in front of bore openings for application of the gage. It is useful for measuring work in jig borers, internal grinders and horizontal boring mills where other types could not be applied.

Six sizes range from ⅜" to 6⅛". Sets are available comprising a single dial unit and two interchangeable heads covering together ⅜" to 1".

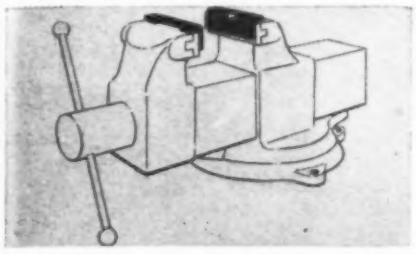
Standard Gage Co., Inc., Poughkeepsie, N.Y.

Gage measuring piece in internal grinder.

Use postpaid card. Circle No. 107

Magnetic Vise Jaw Liners Protect Clamped Work

With the Severance magnetic liner one is provided with a protective cap



that holds to any steel surface—other parts of the vise, on machine, or metal work bench. The caps have ductile copper faces to protect clamped work from scratches, gouges, or other hard-vise-jaw damage.

Severance Tool Industries, Inc., 925 Iowa St., Saginaw, Mich.

Use postpaid card. Circle No. 108

Ultrasonic Cleaners

Designed for industrial cleaning and degreasing requirements, the new line of industrial cleaners is for use on precision components as fine bore tubing, and areas inaccessible to brushes and fragile parts, the company claims. Ultrasonic cleaning is reported as speedy, requiring less man hours, and safe because of less breakage, as well as being thorough.

Units range in tank capacities from two to twenty gallons. There are six models of bench, floor and self-contained styles.

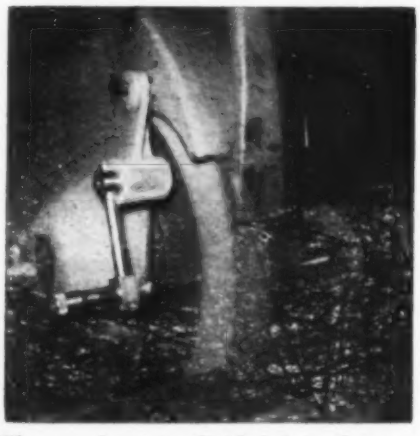
Gulton Industries, Inc., 212 Durham Ave., Metuchen, N.J.

Use postpaid card. Circle No. 109

Micro-Feed Wheel Dresser Dresses Wheel in 5 Sec.

Nu-Dres micro-feed wheel dresser Model 100 (pictured) features micrometer feed and constant control which provide chatter-free dressing, according to the firm, keeping wheel in balance and free of glaze with minimum of wheel loss.

Corner angles are dressed quickly with the permanently mounted Nu-Dres universal attachment Model 200.



The quadrant is divided into degrees and minutes, permitting the precision dressing of any desired angle.

Nu-Dres Tool Co., 3225 W. Burleigh St., Milwaukee 10, Wis.

Use postpaid card. Circle No. 110

Compact Mist Coolant Unit

Spraymist is so designed as to include in one compact unit air filter, trap, regulator and gauge, solenoid valve and conduit box, pressurized coolant reservoir and filter. The unit can readily be mounted in any location.

Coolant and air are separately fed under pressure to the Jet Tip, where they are atomized to produce an efficient cooling mist without sputter or drip.

The unit also features multiple jet operation, made possible by branching from existing lines. Spraymist is available in one-gallon or 18 oz. capacity reservoir. Pictured is the 18 oz. unit.

Bijur Lubricating Corp., 151 W. Passaic St., Rochelle Park, N.J.

Use postpaid card. Circle No. 111

electrical controls for Full Magnetic Chuc performance

A ELECTRO-MAGNETIC CHUCK CONTROL

Releases and demagnetizes work pieces simultaneously. No time lost. No damage to work or chuck face. Protects chuck from voltage surges. Speeds production. Chuck capacities: 50 to 15,000 Watts . . . 60 to 20,000 square inch chuck area.

B ELECTRO-MATIC RECTIFIER

Power conversion Unit, proved for dependable use with Magnetic chucks and other direct current equipment, from 50 Watts to 40 Kilowatts.

C NEUTROLATOR HOLDING POWER REGULATOR AND CHUCK CONTROL

Provides regulation of holding power which permit grinding without shimming, to closer parallelism than ever before possible. In production grinding where holding power must be the same with each work piece, Neutrolator reproduces the same tension on successive pieces without readjustment. Where various tensions are required, a simple dial push-button control provides regulation of holding power.

D ELECTRO-MATIC A.C. DEMAGNETIZER

Demagnetizes dies, punches, cutters, tools that have been magnetized from any source. Works by simple contact. Operates on standard A.C. voltage Will not overheat through constant use. A size for every purpose.

ELECTRO-MATIC PRODUCTS CO.

2237 N. Knox Avenue Chicago 39, Illinois

The Best Is None Too Good For Your Cutting Tools And Dies

No-Dust Grinder With Abrasive Belt Attachment

The Hammond Model ND-12 no-dust grinder has the U-2 abrasive belt attachment for right or left hand mounting. The attachment handles belts from 72" to 90" long and 1" to 2½" wide.

Other attachments available, including a table, make it possible to do platen and contour grinding.

A 12" diameter rubber contact wheel gives a surface speed on the belt of 5500.

Hammond Machinery Builders, Inc., 1651 Douglas Ave., Kalamazoo, Mich.

Use postpaid card. Circle No. 112

Diamond Wheel Line Introduced By Elgin

The Abrasives Division of the Elgin National Watch Co. is expanding its industrial diamond line to include a complete assortment of diamond wheels. It is expected to have wide application among carbide fabricators and regrinders, glass manufacturers, stonecutters, and construction workers.

The wheels will range in size from a quarter-inch size used for carbide internal grinding to a 48" wheel for concrete cutting.

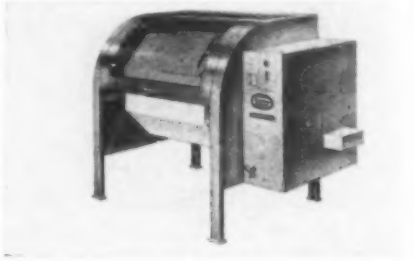
"The initial cost is relatively high, but diamond wheels grind faster, more efficiently and to closer tolerances. Moreover, the life of the wheel is longer than those made of other, softer abrasives," Sales Manager William Baudouine said.

Depending upon the application, Elgin diamond wheels will be available in resinoid, metal or vitrified bond, the announcement said.

Use postpaid card. Circle No. 113

Economical 30" x 32" Barrel Finishing Machine

Designated the Supersheen Model EB-3032, the economical model has a



30" diameter x 32" long barrel for high volume finishing of small parts, as well as fast action on large castings and forgings. A total capacity of 13.8 cu. ft. or 1,000 lbs. can be divided into two compartments.

A variable speed control allows adjustment of barrel rotation speed from 10 to 30 rpm.

Barrels are available Neoprene lined, or unlined. The lining prevents wear on the steel drum and cushions certain parts.

Almco, Queen Products, Inc., Albert Lee, Minn.

Use postpaid card. Circle No. 114

Rust Removing Compound

Rustbuster is an alkaline derusting and descaling compound which is used in removing deep pitted rust and difficult heat scale from sheet, plate, structural steel and precision parts and tools. At a temperature of approximately 180° F., rust and scale can be removed within one to ten minutes.

The compound is available from stock in 100 and 400 lb. drums.

Octagon Process, Inc., 33 Bank St., Staten Island 1, N.Y.

Use postpaid card. Circle No. 115

Profilometer for Measuring Surface Roughness

Of the Profilometer Group III the type QC amplimeter unit shows arithmetical or r.m.s. average roughness height, as selected by switch on panel. It has six ranges—zero to 3, 10, 30, 100, 300 and 1000 microinches.

The tracing speed of the type V mototrace is 0.3" per second, with quick reversals, over any desired length of trace from 1/16" to 2-3/4".

The type LK tracer measures on ID's as small as ⅛"—OD's as small as ⅛"—flats, tapers, and narrow splines.

Micrometrical Manufacturing Co., Ann Arbor, Mich.

Use postpaid card. Circle No. 116

ATTRACTIVELY PRICED

• • •

WRITE FOR CATALOGS

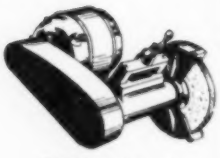
OVER 60 YEARS OF SERVICE TO INDUSTRY

GRINDERS • BUFFERS • DRILLS

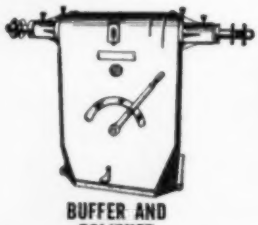
FOR ALL INDUSTRIAL USES

Electrically and mechanically correct. All rotating parts and spindles are precision-balanced dynamically by latest electronic equipment.

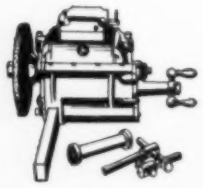
VERTICAL SPINDLE



PRECISION LATH



BUFFER AND POLISHER



TOOL POST

GRINDER AND BUFFER

The United States Electrical Tool Co.

3640 LLEWELLYN ST., CINCINNATI 23, OHIO

Scribing Tool With Safety Feature

The tapered section of the carbide scriber reverses into handle, providing a safety feature against damage or injury to the user. Featured also is a powerful Alnico-5 magnet on the opposite end from the scribing tip for holding screws, nuts, or nails for easy starting in confined places. The scriber marks, scores and scribes on practically any material.

Model SM-100 scriber and magnet is priced at $1.65. Model S-50, scriber only, is $1.25.

Waller Machine Products Co., 2335 W. Montrose Ave., Chicago 18, Ill.

Use postpaid card. Circle No. 117

Flash and Grinding Safety Spectacles

The No. 7000 Series flash and grinding safety spectacles, available in three styles, are designed for extra strength

and heavy duty to assure maximum protection against frontal hazards and, where side shields are provided, deflect hazardous flying particles.

Glendale Optical Co., Inc., 600 W. Merrick Rd., Valley Stream, L.I., N.Y.

Use postpaid card. Circle No. 118

Tool Grinding Fixture

A line of tool grinding fixtures, for tool makers, machinists and tool cribs, is used with a surface grinder. The bit is locked by a set screw in a square

hole in the fixture, and the fixture is placed on the magnetic chuck of the surface grinder.

The No. 12-L fixture is used to grind a lathe cut-off or parting tool. Both ends of the unit, which contact the magnetic chuck, have compound angles accurately ground, to give correct clearances to the cut-off tool.

The fixture takes all size bits, ½" or smaller. It is priced at $9.95.

R. L. Spellman Mfg. Co., Urbana, Ohio.

Use postpaid card. Circle No. 119

Diamond Dressers Accurately True Up Honing Stones

The Tru-Hone diamond dressers will accurately true up honing stones in most any honing tool, according to the announcement. New honing stones assembled into a honing tool may have a slight taper, be barrel shaped or they may be concaved. The dresser was designed to remove imperfections and es-

tablish size on the honing stones before they are used for honing. Honing stones are dressed true in a few seconds. The thousands of diamonds in these dressers are metal bonded. The inside diameters of the dressers are made to the same inside diameter as the work to be honed.

Staple Engineering Co., 1315 South Woodward Ave., Birmingham, Mich.

Use postpaid card. Circle No. 120

Solid Film Lubricant

A resin bonded solid film lubricant, called Surf-Kote H-108, bonds directly to metal surfaces by a resinous material, forming a solid, dry film of lubrication. The film prevents contact between metal surfaces providing a low coefficient of friction which eliminates galling, seizing, cold welding and fretting corrosion.

Hohman Plating & Manufacturing Co., 814 Vermont Ave., Dayton, O.

Use postpaid card. Circle No. 121

DON'T GET LOST in the "PROFIT SQUEEZE"!

New slants to save your time, cut your costs, improve your product quality

Now is the time to look into Brightboy's unique action in metalworking. Break the profit squeeze with Brightboy, improve your product at a lower cost.

Abrasive and rubber function simultaneously to BURR, CLEAN, FINISH, POLISH, in a single step, time saving operation. No muss, no fuss! A Brightboy finish frequently constitutes the final polish—definitely improves product quality.

In Brightboy's wide range of STOCK grains and textures you have exact selection of an abrasive JOB-MATCHED to your work. Aluminum Oxide and Silicon Carbide grains come in grades from extra fine to extra coarse, in soft, firm and tough rubber binders; take the place of "special" compounds; prove their versatility on regular as well as special finishing.

Made in WHEELS, STICKS, RODS and BLOCKS for machine and manual applications. Ask your dealer to recommend the Brightboy numbers for your needs, and for the Brightboy catalog listing applications and machine speeds. Write for "Notes From The Brightboy Service Engineer" describing cost-saving Brightboy applications and uses.

TIME-SAVING FEATURES

Works to close tolerances
Can be shaped to contour
Produces conventional and special finishes and patterns, frequently the final polish
No before-use preparation or dressing
No skilled labor required

GENERAL USES

Removing light digs, tool and heat marks
Cleaning welded and soldered joints
Burring and finishing castings, stampings, machined and molded parts
Maintenance of tools and machinery

WRITE FOR FREE SAMPLE
BRIGHTBOY HAND PIECE
for quick-job cleaning

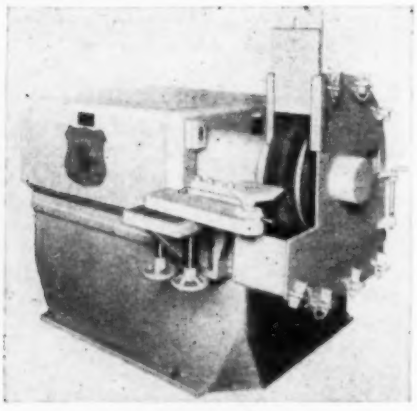
BRIGHTBOY INDUSTRIAL DIVISION
WELDON ROBERTS RUBBER CO.
95 North 13th Street Newark 7, N. J.

WELDON ROBERTS
Brightboy
RUBBER CUSHIONED ABRASIVES

America's Pioneer Manufacturer Of Rubber-Bonded Abrasives

NEW EQUIPMENT *continued*

Hydraulically-Driven Snagging Grinder



The Model 61HVS eliminates gears, belts and adjustable pulley drives. The hydraulic drive is operated by a totally-enclosed fan cooled ball bearing motor working a hydraulic pump which moves the fluid contained in the grinder base through the hydraulic motor. This provides constant horsepower, constant peripheral speed and automatic wheel wear adjustment, according to the firm.

An automatic speed changer is furnished with the grinder.

The United States Electrical Tool Co., Llewellyn St., Cincinnati 23, Ohio.

Use postpaid card. Circle No. 122

Electric Press

The 24" electric press has been added to the manufacturer's line of abrasive belt splicing equipment. Belt splicers can be supplied in 8", 14", 24", 36", and 50" sizes. Each machine will splice belts from narrowest to the width of the electric press.

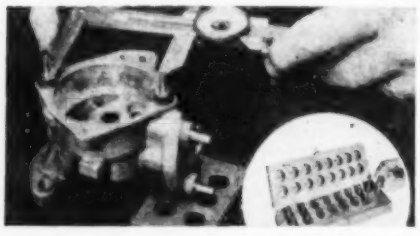
Econaway Manufacturing Co., 722 No. Main St., Bellevue, Mich.

Use postpaid card. Circle No. 123

Plug Gages

The threaded precision plug gages, called Jo-Plugs, consist of a threaded plug base and an upper spindle called a Jo-spindle. The Jo-Plugs are made of hardened Graphmo tool steel and are precision ground. The Jo-spindles act as a constant throughout the entire range of plug sizes and are a uniform .200 in diameter.

To check center distances, proper size gages are screwed into the holes, allowing the Jo-spindle to act as reference measuring points. The checker then has only to measure the distance between the Jo-spindles, and add the constant (.200), to obtain the distance between centers, within a tolerance of ±.00015.

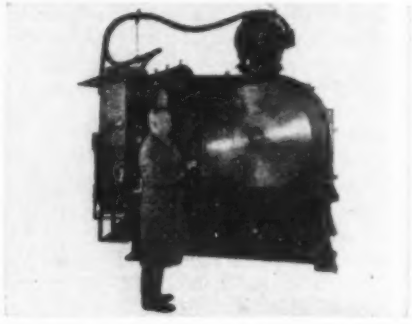


The gages are available in boxed sets in thread sizes ranging from No. 4 to 1", National fine or coarse thread or special thread forms.

Spence Industries, 6910 Chase Rd., Dearborn, Mich.

Use postpaid card. Circle No. 124

Friction Saw



The friction saw incorporates an electronic, variable torque feed which eliminates the need for hydraulic oil lines, pumps and storage tanks. The coolant system is said to assure cool-edge, dry-blade cutting.

Models have been produced in 40, 75, and 150 hp sizes.

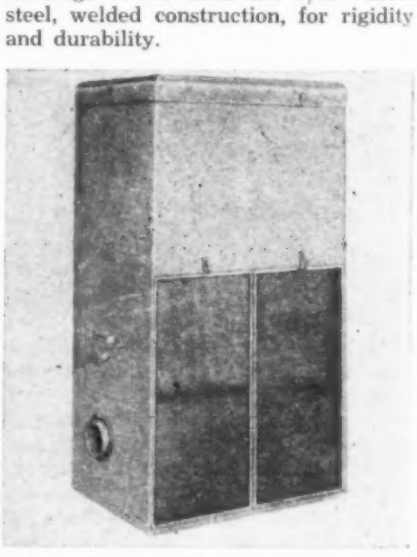
Ty-Sa-Man Machine Co., Inc., 1016 White Ave., Knoxville, Tenn.

Use postpaid card. Circle No. 125

Compact Dust Collector

In all sizes of the type "M" unit collectors, the dust laden air is delivered to a small diameter, high efficiency, centrifugal pre-cleaner where all but the finest particles are removed. The air then passes through steel wool filter pads, three inches thick, for final cleaning.

Although three model sizes are available, 450-900-1800 cfm, the largest unit is only 26"x40"x72½". The extra heavy housings of the units are 1/16" sheet steel, welded construction, for rigidity and durability.



The Kirk & Blum Mfg. Co., 3100 Forrer St., Cincinnati 9, Ohio.

Use postpaid card. Circle No. 126

get ALL universal features plus real economy . . .

STERLING "G-2"
Universal
TOOL & CUTTER GRINDER

Sterling Features include . . .

- **25° Tilting Spindle**
- **360° Spindle Rotation**
- **Anti-Friction Table**
- **180° Table Swivel**
- **2 Speed Table Traverse**
- **10¾" Swing Over Table**
- **Rugged Construction**

Accuracy, Long Life and Low Upkeep are Built-In

From the heavy cast, vibration damping, base to the two speed motorized tilting spindle the STERLING "G-2" is built for easy operation and maximum accuracy. Set-ups can be made faster on a wider variety of jobs because of the built-in versatility of the STERLING "G-2". Work is finished more accurately, too, because of the built-in stability.

For maximum capacity, versatility and accuracy with minimum investment, investigate the STERLING "G-2" Universal Tool & Cutter Grinder. Plain grinder also available. Ask your STERLING Dealer or write direct for details.

McDONOUGH MANUFACTURING CO.
1522 GALLOWAY EAU CLAIRE, WISC.

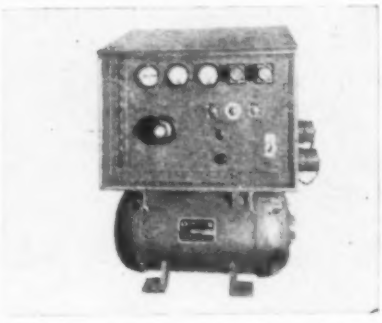
Contact Wheel

A lightweight contact wheel for abrasive belt grinding and polishing, called the Econ-O-Wheel, has been announced. It features Duro-Red live rubber, a quality rubber of high resiliency, and a throw-away hub, which eliminates sending to the factory for recovering.

Nazar Rubber Co., P.O. Box 316, Toledo 7, Ohio.

Use postpaid card. Circle No. 127

Motor Alternators



High frequency motor alternator sets with 400-cycle alternators have been developed. The alternator has no commutator, slip rings or rotor windings. It maintains close output voltage regulation and has low radio noise level and low harmonic content, according to the firm.

Electrical Div., Safety Industries, Inc., P.O. Box 904, New Haven 4, Conn.

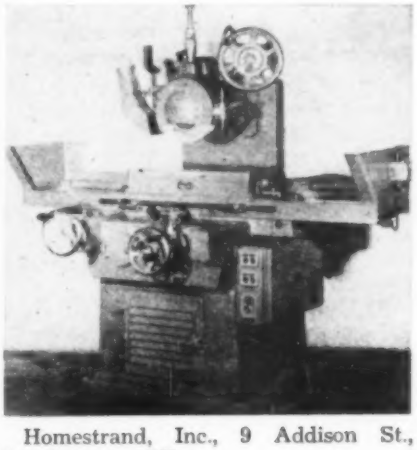
Use postpaid card. Circle No. 128

Hydraulic Surface Grinder

A Swedish hydraulic surface grinder, made by Malcus of Halmstad, is available in three sizes, 9" x 24", 10" x 29", and 12" x 39".

The units feature adjustable precision roller bearings and spherical ball bearings, specifically combined for controlling the thrust of the spindle. The hydraulic system is amply dimensioned, table movements are rapid and smooth, making the whole working surface of the table available for utilization.

A large variety of accessories is available.



Homestrand, Inc., 9 Addison St., Larchmont, N.Y.

Use postpaid card. Circle No. 129

Concentrate For Wet Grinding

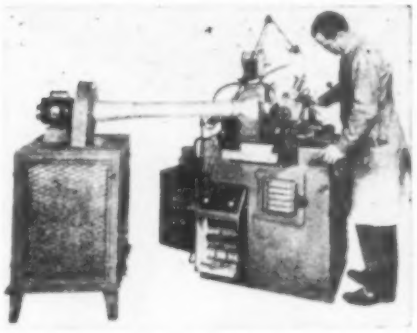
Grind-All is a concentrate or additive which is used in the proportion of one quart to thirty gallons of regularly used coolants. The concentrate keeps the wheel open for faster cutting and eliminates many shut-downs to dress wheels. It is designed for production wet grinding, for camshaft, crankshaft and head grinders and for valve refacing machines.

Stadoil Manufacturing Co., Dept. G, 3300 N. Durfee Ave., El Monte 5, Calif.

Use postpaid card. Circle No. 130

Mist Collectors

Three separate models of the Torit mist collectors are designed for use in wet machining operations of automatic screw machines, tool grinders, surface grinders, thread grinders, and other mist producing operations.



Advantages of the unit include elimination of unpleasant and toxic mists imperiling employees' health, and reduction of fire hazards from inflammable or explosive mists.

Torit Mfg. Co., Walnut & Exchange Sts., St. Paul, Minn.

Use postpaid card. Circle No. 131

Grind All Types of Profiles To Extreme Accuracy with Studer PSM's

PANTOGRAPH RATIOS

PSM 250 1:1 — 10:1

PSM 130 1:1—100:1

APPLICATIONS

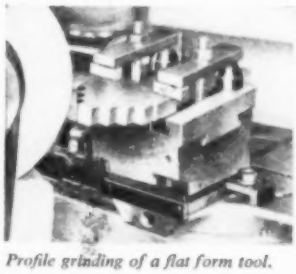
(With Automatic Grinding Wheel Feed)

- Grinding of flat form tools
- Grinding of circular form tools
- Grinding of sectional dies
- Taper relief grinding
- Grinding of crushers or rolls between centers
- Grinding to complete 360° contours

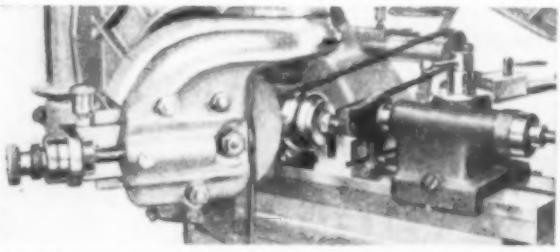
Punches and inserts of guide plate and cutting plate, with respective clamps—ground on a Studer.

ADDITIONAL SPECIFICATIONS

	PSM 250	PSM 130
Maximum template length	24"	16"
Profile length in one setting	16"	6"
Diameter of crushers or rolls	10"	4"



Profile grinding of a flat form tool.



A Studer set up for cylindrical grinding. Workpiece held between centers.

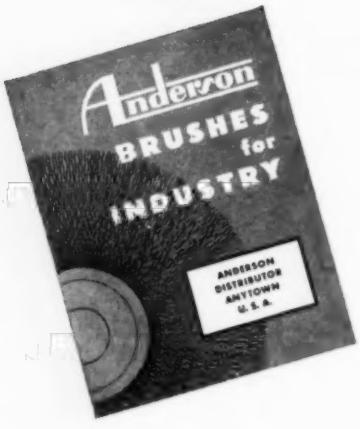
Write For More Information

COSA — *nationwide sales and service of precision machine tools—from bench lathes to boring mills.*

COSA CORPORATION, 405 LEXINGTON AVENUE, NEW YORK 17, N.Y.

THE TOOL

THE TECHNIQUE



For lowest cost per unit processed they're both

Anderson

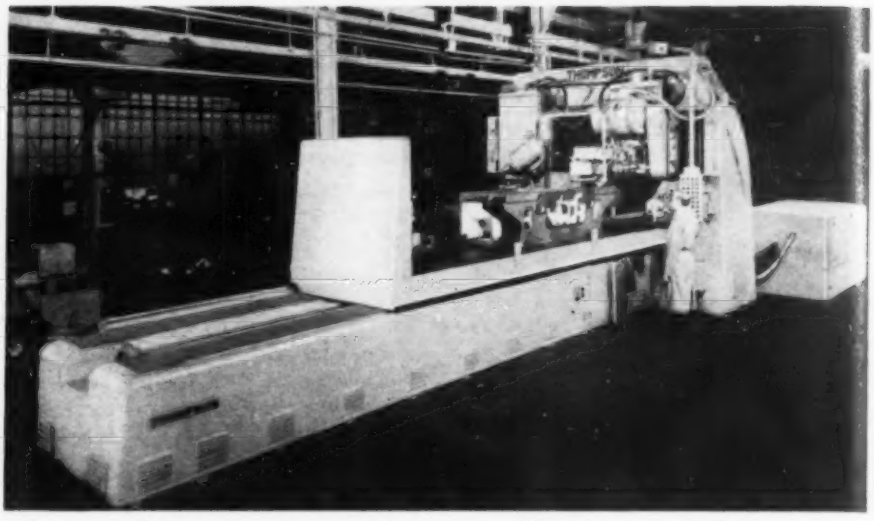
Write for complete catalog of wire brushes, with detailed selection and operation data.

Anderson

ANDERSON CORPORATION

1052 Southbridge Street Worcester, Mass.

Surface Grinder Features Anti-Friction Ball Nuts



An unusual design was incorporated in the Thompson Hydrail surface grinder in the form of anti-friction, recirculating ball nuts, to meet the demand for positive, fast and accurate vertical travel specified by the job requirements of the company for which it was designed and built. The use of these ball nuts reduces friction between nut and screw to a minimum, positions the rail more accurately without counterbalancing, and also extends the life of the screws indefinitely.

Another feature is found in the design of the way bearings for the transverse travel of the horizontal and vertical wheel heads. Here, a recirculating roller chain, contacting hardened and ground Vee ways, provides great accuracy and positive transverse movement.

The model is also equipped with the new patented Thompson Hydra-Cool hydraulic system which, by reducing hydraulic heat to the barest minimum, eliminates any and all heat distortion throughout the machine. The table is supported on large Vee and flat ways and is pressure lubricated by a separate oil system, separate from the hydraulic system.

Independent operations of the horizontal and vertical wheel heads is another design feature.

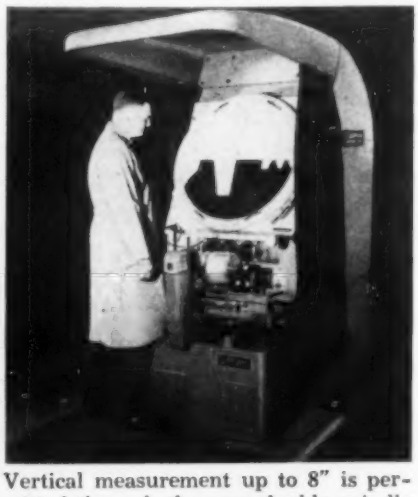
The Thompson Grinder Co., Springfield, Ohio.

Use postpaid card. Circle No. 132

Optical Comparator Inspects Heavy Parts Up to 200 Lbs.

The model FC-30ER extended range optical comparator inspects extra-large, heavy parts up to 200 lbs. or more.

Up to 10" of lateral measurements is provided with a heavy duty table.



Vertical measurement up to 8" is permitted through the new double spindle table support. The total 80 sq. in. of measuring area is easily accessible to the operator.

All standard comparator attachments are available, including normal and oblique surface illumination, tracing and photographic attachments and overlay chart rails.

Jones & Lamson Machine Co., Springfield, Vt.

Use postpaid card. Circle No. 133

Dressing Tool Increases Diamond Life 10 Times

A new type of diamond dressing tool, called Di-X, is reported to increase diamond life as much as ten times or more.

Special X-ray equipment is used to orient and exactly position a diamond in the tool so that its maximum hardness and abrasion resistant characteristics can be fully utilized.

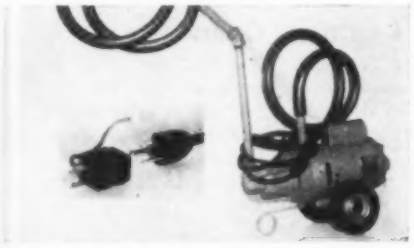
Abrasive Dressing Tool Co., 14528 Second Blvd., Detroit 3.

Use postpaid card. Circle No. 134

Coolant Service Pump

The coolant service pump is said to deliver one gallon of coolant every 4.7 seconds with 25' suction lift. It oper-

ates on 110 volts, utilizing 1/3 hp electric motor, and the Moyno positive pressure pumping principle.

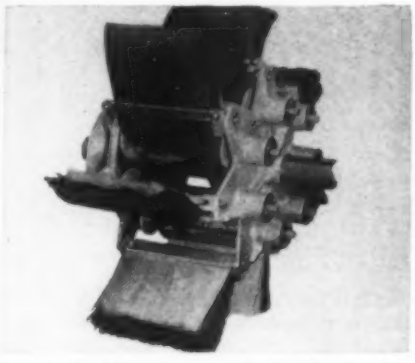


Associated Engineers, Inc., Springfield, Mass.

Use postpaid card. Circle No. 135

Abrasive Head Replenishes Worn Material

The Smooth-O-Matic head for finishing metals and woods carries a supply of abrasive for replenishing worn



material. The material is fed from rolls automatically. Heads are available in abrasive widths of 2" to 50".

Abrasive Machinery Corp., 444 So. Pennsylvania St., Indianapolis 25, Ind.

Use postpaid card. Circle No. 136

Motor in Ratings Up to 2000 HP

The all-weather climatized vertical hollow shaft motor, in ratings up to

2000 hp, is designed for indoor and unprotected outdoor service in irrigation, municipal, petroleum, public utility and industrial pumping applications.

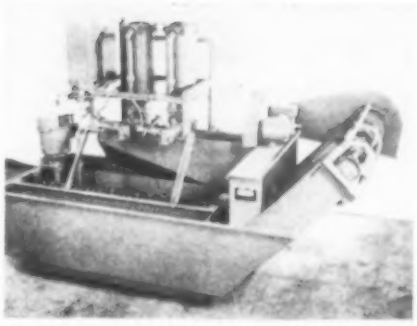
The insulating materials provide optimum resistance to moisture and chemical contaminants, and have high mechanical strength for added life. A maximum of two-high angular bearings are used in the motor to prevent excessive wear and reduced thrust capacity.

The Louis Allis Co., 427 E. Stewart St., Milwaukee 1, Wis.

Use postpaid card. Circle No. 137

Cartridge Filter Filters to Five Microns

The Henry back-flushing cartridge filter will filter honing, lapping and auto-screw machines, and bore drilling oils, to five microns and under particle sizes at 5 to 500 gpm. Cartridges can be backflushed either by hand or automatically as required to maintain a predetermined flow rate.



Henry Manufacturing Co., Inc., P.O. Box 219, Bowling Green, Ohio.

Use postpaid card. Circle No. 138

INCREASE CENTERLESS GRINDING PRODUCTION

200%, Yes— 300%

WITH THIS NEW AUTOMATIC INFEED GRINDING ATTACHMENT

Utmost precision in grinding and duplicate sizing. Sizing dial is graduated in (.00001) one hundredth of a thousandth of an inch. No hydrocheck to change feed rate when oil is cold. No checking of oil level or refilling of hydrocheck. Three (3) different feed rates are available in one unit for the fastest, most efficient, and precise sizing in a centerless grinder.

CAN BE USED FOR TRU-FEED AS WELL AS INFEED for close sizing. Ideally located push button control station consists of Stop-Button, Start-Button, Caution Pilot Light, and a selector switch for set up or auto grinding positions. CATALOG Write for it today!

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● ACTUAL MANUFACTURERS OF RESINOID METAL AND VITRIFIED DIAMOND WHEELS UP TO AND INCLUDING 20" DIAMETERS

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● MANUFACTURERS OF RESINOID AND RUBBER BONDED WHEELS SERVING THE AIRCRAFT, CUTLERY AND STEEL FABRICATING INDUSTRIES.

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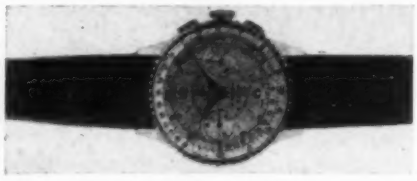
Watch With Slide Rule

Designated the Chronomat, the combination chronograph and slide rule



performs calculations such as multiplication, division, ratios, exchange, interest, etc. The watch is also available in a solid gold case.

Wakmann Watch Co., Inc., 15 West 47th St., N.Y. 36, N.Y.

Use postpaid card. Circle No. 139

Motors as Small as 3/10" Dia.

Among the high performance features claimed for the Model M-100 servomotor are very rapid response (reaches full speed of 1450 rpm in

4/1000ths of a second), exceptional internal damping, and resistance to shock and high temperatures. Simplified coil and stator assembly permits the manufacture of practical miniature motors as small as 3/10" diameter.

Dynamic Instrument Corp., 59 New York Ave., Westbury, L.I., N.Y.

Use postpaid card. Circle No. 140

Barrel Finishing Compounds

Five new Supersheen barrel finishing compounds cover processing needs including brightening, grinding, deburring, burnishing and inhibiting rust.

An alkaline, powdered composition, Supersheen No. 407, used in brightening ferrous parts, provides micro-inch improvement. Supersheen No. 408 is a powdered grinding compound for fine grinding on all types of metals and alloys. No. 410 is an alkaline compound designed for light deburring and coloring cycles on ferrous metals. No. 412 is a highly concentrated burnishing compound for use with all steel and chip medias on both ferrous and non-ferrous metals. No. 501R is a concentrated mild alkaline compound designed to inhibit rusting of all ferrous metals.

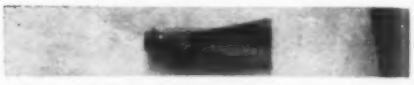
Almco, Division of Queen Products, Albert Lea, Minn.

Use postpaid card. Circle No. 141

Lapping Compound

Tetrabor Paste has over 80% of diamond hardness, a specific weight next to diamond and a greater pressure resistance than all other abrasives, according to the firm.

Uses of the paste is for the lapping of carbide dies and blanks, polishing of plastic moulds and die casting dies, lapping of gauges and holes in die work, die faces and the lapping of cutting edges of various types of cutting tools for greater wear.



Titan Tool Supply Co., Inc., 1419 Hertel Ave., Buffalo 16. N.Y.

Use postpaid card. Circle No. 142

Resinoid Bonded Wheels For High Speed Grinding

A complete line of resinoid bonded grinding wheels for all types of high speed grinding applications are now being offered.

The resinoid bonded wheels are produced of finest quality aluminum oxide and silicon carbide abrasive grains. All wheels are carefully machined on every surface to provide close tolerances and sharp, clean-cutting surfaces. Each Dayton-Safety wheel is thoroughly inspected and speed tested for safe, dependable performance.

Simonds Worden White Co., 1101 Negley Place, Dayton, Ohio.

Use postpaid card. Circle No. 143

Recorder Shows Operator Efficiency

A single graphic line shows the efficiency or utilization of output of operators, machines or processes. The line is instantly readable and understandable. The recording is made continuously, automatically, accurately.

The recorder is used to monitor broadcast current beyond maximum

normal limits. Very often it is used to determine why a device fails or is turned off for any type of reason.

Gorrell & Gorrell, Westwood, N.J.

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Abrasive Society News

MARVIN ANDERSEN, Charter Chairman (left) is given an award for service at the May 19 meeting of the Western Michigan Chapter of the ASA by Paul Watson, Chairman. Vice-Chairman Ralph Ploughman looks on.

OFFICERS OF THE WESTERN MICHIGAN CHAPTER of the ASA meeting held May 19 were the following: standing left to right, Paul Watson, Trustee; Marvin Andersen, Charter Chairman, Trustee; Ralph Ploughman, Chairman; Charles Hennesen, Vice-Chairman; Sidney Tornga, Trustee; J. Harvey Snell, Program Committee; seated left to right, William McCormick, Trustee; Ted O'Connell, National Chairman; Paul Starks, Secretary-Treasurer.

New Jersey Chapter—A demonstration of Electronic Machinery Analysis Equipment was given by James T. Roberts, Division Sales Manager of International Research and Development Corp., at the June 18 meeting held in Paramus. During the business portion of the meeting an election of officers was held.

Pittsburgh Chapter—The following officers were elected at the May 22 meeting: Pres., C. G. Beattie; Vice-Pres., Russell J. Ecker; Secy., Frank F. Cramer; Treas., Keith Bishop. In addition, the following were elected to serve on the Board: John Danneker, Joseph DeBlander, Paul Eisenhuth, Thomas E. Rea.

Western Michigan Chapter—At the May 19 dinner meeting, attended by 69 members and guests, C. R. Stroupe, Vice-Pres. of Anocut Engineering Co., Chicago, gave a talk on "Electrolytic Grinding." Color slides illustrated many of the points discussed.

Long Island Chapter—The June 11 meeting was attended by 55 members and guests who heard Malcolm Maynes of the Norton Co. give a talk on "Abrasive Barrel Finishing."

Detroit Chapter—A gratifying turnout of members and guests at the May 22 meeting heard a stimulating program on "Surface Refinement and Juncture Blending" presented by E. R. Fisher of the Osborn Manufacturing Co. Cal Edwards, President of the Chapter, reported that the membership goal of 100 will undoubtedly be surpassed before the end of the year.

Hudson-Mohawk Chapter—The newly-organized Hudson-Mohawk Chapter held its regular monthly meeting May 5 at Menands, N.Y. Robert Murphy of The Carborundum Co. presented an interesting talk, accompanied by slides, on the manufacture, treatment and sizing of abrasive grain. The next meeting was scheduled to be held June 2, and was to be the last before the summer vacation.

Boston Chapter—Some fifty members and guests attended the May 27 meeting in Cambridge. William A. Corse of The Carborundum Co. gave a talk on the "Application of Coated Abrasives." Miss Almitra P. Sidhwa of Grindwell Ltd., India, a chapter member, also gave an interesting talk. The following officers were elected to serve until June 30, 1959: Chairman, Philip E. Bloom; Vice-Chairman, John H. Ciccolo; Treasurer, Charles A. McQuarrie; Secretary, I. C. Day. The next meeting will be held September 23.

Reading Chapter—An interesting film, "Future of the Grinding Wheel," was shown at the May 19 meeting. J. M. Price of Simonds Abrasive Co. led the discussion which followed. Officers elected for the coming year are: Pres., Howard Burkhardt; Vice-Pres., Paul A. Miller; Secy., Joe Acker; Treas., Norman Snader. These officers will preside at the next meeting which will be held at the Valley Inn in September, after the Chapter's annual summer hiatus.

Machine Tool Buyers

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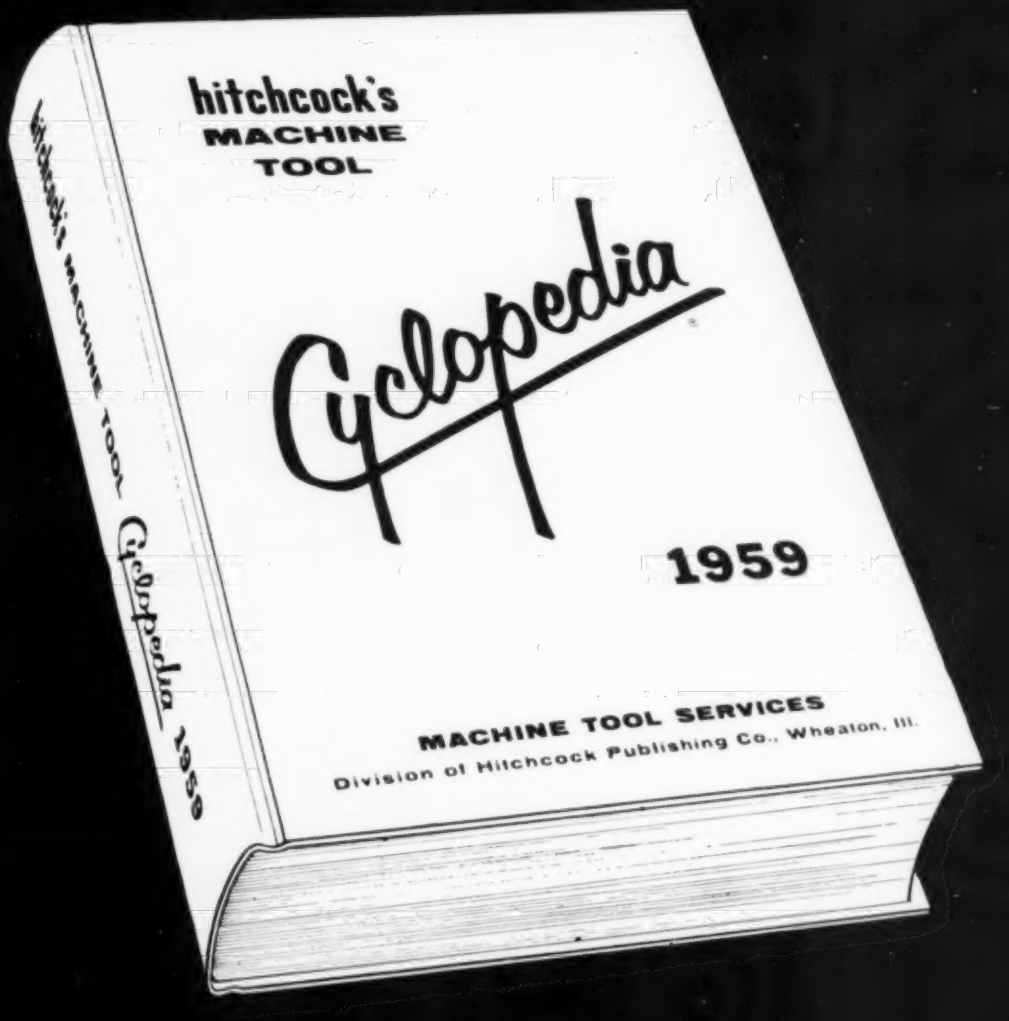


News of Industry

Boyar-Schultz Celebrates Its 30th Anniversary

On Saturday, June 28, the Boyar-Schultz Corp. celebrated their thirtieth anniversary of service to industry. The informal gathering at the Svithiod Club of Chicago was limited to family members of the organization, with President Frank Korte highlighting the program. He traced the history and growth of the company over these crucial years. Five new products have been introduced in this thirtieth year.

An entertaining program and dancing followed dinner.

Torit Produces 40,000th Industrial Dust Collector

Torit Manufacturing Co., St. Paul, celebrated production of the firm's 40,000th industrial dust collector in June. The 40,000th unit was about the size and appearance of a small filing case, making use of specially-woven cotton filters to remove dust. It was ordered by Gallmeyer & Livingston, Grand Rapids, Mich.

Dust collectors have found an increasing market in recent years, Torit reports, because of industry's efforts to protect employee health and comfort, and to reduce plant and machine maintenance.

R-O Grinder Offers Training Program

A two-day training program for R-O Universal Form Relieving Fixture and Grinder operators has been instituted by the manufacturers of the equipment, Royal Oak Tool & Machine Co., Royal Oak, Mich. The program consists of approximately fourteen hours concentrated instruction covering set-up and adjustments, method of grinding a variety of tools, internal grinding, grinding of cams, squares, etc., use of accessories and equipment service and maintenance.

The company will pick up men arriving for the course, and provide first class motel accommodations and meals. There will be a charge of $50.00 to cover incidentals for the two days. Customers may set their own dates on which they wish to take the course, subject to adequate notice.

HORTON CHUCK DIVISION of the United-Greenfield Corp. has recently completed a plant in New Haven, Conn. Shown conferring outside the plant are George Chiaramonte (middle) Horton Division Sales Manager and Raymond Helbig (right) Greenfield Advertising Manager. In consolidating the sales force, Geometric and Greenfield men will take over as direct salesmen, replacing manufacturers' agents, in all areas other than Cincinnati. Currently being produced are the new 46" dia. 12-jaw universal type chucks, used for holding large diameter missile parts.

Wheelabrator Forms New Barrel Finishing Div.

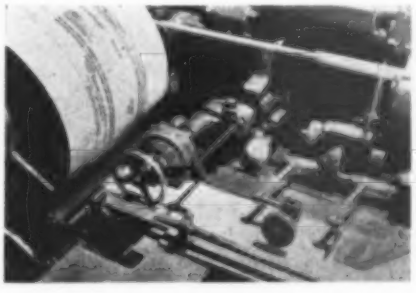
Formation of a new barrel finishing and wet blasting division of Wheelabrator Corp., Mishawaka, Ind., has been announced. By acquiring the assets of Crandall Engineering and Manufacturing, Inc., Vicksburg, Mich., the company adds a complete line of barrel finishing machines.

General Manager of the new division will be Jacob A. Schmidt, Jr., Secretary-Treasurer of the parent company. George H. Lieser will be Wet Blast Product Manager, and Roy T. Romine will be Barrel Finishing Product Manager and Chief Engineer.

The Hayfred Co. of Springfield, Mass. announced the appointment of **G. E. Parlette and Associates** of Atlanta, Ga. to represent them in the Southern area. **Tool Supply and Engineering Co.** of Dallas, Tex. will handle sales in the northern section of Texas.

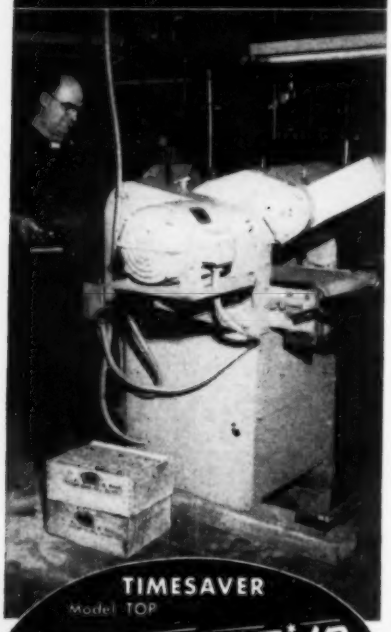
The Form-All Manufacturing Co., Long Valley, N.J. has appointed the **American Coldset Corp.**, Teterboro, N.J. as national distributor and exclusive sales agents for the Form-All Contour Rex grinding wheel face forming unit.

Hyprez Division of Engis Equipment Co., Chicago, announces the appointment of **Severance Tools of Canada, Ltd.**, 1232 Eglinton Ave., West, Toronto, as Canadian representative. The Severance organization will maintain complete stocks of Hyprez diamond compounds and accessories, for lapping and polishing dies, molds, tools, gages and parts.



THE NORTON ABRASIVE WHEEL pictured acts as a positive action feed roller in the Class 3700 Bill Printer made by the Addressograph-Multigraph Corp. of Cleveland. The value of the wheel is that its surface, consisting of many sharp particles of abrasive, advances the paper without slippage. The abrasive paper-covered drum at the left serves as an impression roller, pressing the paper against a printing roller beneath. This machine is used at the State Mutual Life Assurance Co. of America to prepare statements to their assured. (Report from Norton Co., Worcester, Mass.)

"650 metal stampings deburred in 10 minutes"



TIMESAVER
Model TOP
SPEEDBELT 12
ABRASIVE BELT SANDER

V. A. BOKER & SONS, Minneapolis, Minn., manufacturer of precision metal stampings reports:

"We processed 675 metal stampings using a Speedbelt 12 and 2 men in 1 hr. 40 mins. or 3 hrs. 20 mins. of direct labor charged against the job. By old deburring methods this run would have taken in excess of 20 hours. Another run of 650 metal stampings was completed in 10 mins., or 20 mins. direct labor compared to 4 hrs. by former deburring methods. These runs are typical of the savings in production time we have made on this type of work. We also find we are achieving a much better finish as well."

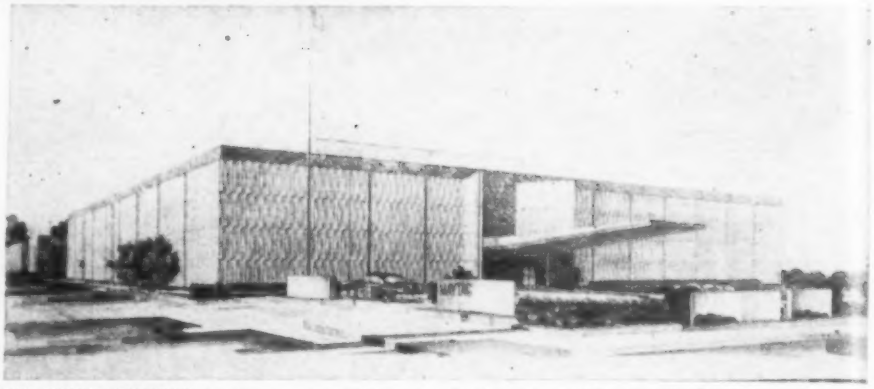
TIMESAVER "SPEEDBELT" SANDERS CAN HELP CUT YOUR PRODUCTION COSTS . . . TOO!

V. A. Boker & Sons' experience is typical of the many installations where versatile, low-cost Timesaver "Speedbelt" Sanders have replaced slow, costly deburring, finishing and polishing methods. Timesaver Sanders are built in 12", 18", 24", 38", 50" and 54" models . . . a size and type to solve most polishing, finishing and deburring operations on solid or perforated aluminum, stainless steel and other metal sheets, bars and blanks.

INVESTIGATE the advantages of these amazing machines and hi-speed abrasive belt operations for your shop. Write for literature today.

TIMESAVER SANDERS
Box 7446, Robbinsdale Station
Minneapolis 22, Minn.

NEWS OF INDUSTRY *continued*



THE MAYTAG COMPANY has begun construction of a headquarters building at Newton, Iowa. The new building, 216'x208' and containing over 132,000 sq. ft., will be four times the size of the present main office, which is to be incorporated into the new structure, making a single, integrated building. The expanded building will house, on three floors, all of the headquarters personnel except the research division, already in its own building.

Whitnon Manufacturing Co., Farmington, Conn., makers of Whitnon spindles for boring, grinding, milling and drilling since 1946, announce the opening of their newest plant specializing in the repair and reconditioning of all types of industrial anti-friction spindles. The plant is located at 20466 Wyoming Ave., Detroit 21, Mich.

The Hill Acme Co. of Cleveland, Ohio, has appointed **The McBeth Machinery Co.,** 300 Mt. Lebanon Blvd., Pittsburgh 34, Pa. and **The Peninsular Machinery Co.,** 19178 James Couzens Highway, Detroit 35, Mich. as exclusive agents for their respective territories, to cover the sale of the entire line of Hill hydraulic surface grinders. The McBeth Machinery Co. will cover Pennsylvania and West Virginia, as well as small portions of adjoining territories. The Peninsular Machinery Co. now covers the western half of lower Michigan.

C.I.T. Corporation, New York City, industrial financing firm, has opened a new division office in Seattle, Wash., serving the territory covering Washington, Montana and northern Idaho. **F. L. Conrad,** who has been elected an Assistant Vice-President, will be in charge of the new Seattle division office. He was Sales Manager of the Portland office previously. **W. G. Duncan** will be Assistant Secretary at the new division.

New officers have been elected by the Directors of Clark, Cutler, McDermott Co., Franklin, Mass. President of the firm is **F. Roland McDermott. Leo G. McWilliams** is Treasurer, and **Henry J. Aimone,** Vice-President. **Charles W. Rice,** Vice-President of Whiting & Davis Co., was elected a Director of the company.

Jack T. Welch was appointed Vice-President, in charge of Field Sales, and **William I. Wilt** was named Vice-President, Gage and Instruments Division, of The Sheffield Corp. Previously both men were Assistant Vice-Presidents of their respective divisions. **Victor J. Boll** was promoted from General Manager to Assistant Vice-President of the Contract Manufacturing Division, and **Thomas W. Clark,** previously General Manager of the company's out-of-Dayton plants, is now Assistant Vice-President of the Service Facilities Division.

F. C. Stockinger

R. F. Kelleher

Fred C. Stockinger, currently West Coast District Manager for the Bay State Abrasive Products Co., Westboro, Mass., will be transferred to the company's home office to assume new duties as Assistant Sales Manager. He will assist Elden L. Auker, Vice-Pres., Marketing, in administration of Bay State's grinding wheel sales organization. **Robert F. Kelleher** will become West Coast District Manager, replacing Stockinger.

Stockinger joined the Cleveland sales organization in 1946. Previously he was affiliated with the Ex-Cell-O Corporation. Before coming to the company in 1952, Kelleher was an industrial relations trainee with American Steel & Wire Co.

Richard Rhodes has been transferred from the Detroit branch office of the American Air Filter Co., Inc., to its home office in Louisville, Ky., as a supervising engineer in the Unit Ventilator Products Dept. He will serve the firm's Midwest Region.

R. E. Reid

W. B. Panko

Robert E. Reid has been promoted from Assistant Manager to General Manager of the Hyprez Division, Engis Equipment Co. Reid will be in charge of all service to distributors and customers of Hyprez diamond compounds, Hyprez oscillating tool finishing machine, Di-Profiler reciprocating hand machine and accessories.

Walter B. Panko has been appointed National Sales Manager of the Division. Panko succeeds **Joseph M. Throckmorton** who is retiring from active duty after 16 years.

E. G. Bowerman, Jr., has been named Sales Manager of Bearings, Inc., Cleveland, Ohio. He is a veteran of 24 years with the firm and its predecessor company.

Malcolm J. Rowe has been appointed to the position of Manager of Marketing for the Airborne Instruments Laboratory, a division of Cutler-Hammer, Inc. Rowe joined the company as Assistant to the President in February, 1957. Prior to affiliating with them, he was Executive Vice-President of Clay Adams, Inc.

C. John Sundberg, Assistant to the Vice-President and Director of Sales at Norton Co., has retired. He had worked for the company for 46 years, having been employed in the Order Department, and then the Worcester sales office until 1951, when he was named to his most recent position. He was a specialist in pricing of abrasive products.

Myles A. Snyder, Norton Co., abrasive engineer in the Iowa area since 1951, has been transferred to a similar position in the San Francisco Bay area. Two recent graduates of the sales training course have been assigned to district offices as field engineers: **John H. Saunders,** to the Pittsburgh office, and **William D. Pollard,** to the St. Louis office.

Robert W. Bennett has been named a Field Engineer at the St. Louis office of Norton Co. He joined the firm a year ago after several years in banking and insurance.

R. W. Bennett

P. E. Fedeles

P. E. Fedeles has been appointed Sales Engineer for the Latrobe Steel Co. in Western Michigan. He has been a metallurgical engineer in the Standards and Inspection Department, as well as a metallurgical engineer in the Sales-Service Department.

Dr. Andrew C. Hilton was named to the newly-created post of Director of Personnel Planning and Development for Raytheon Mfg. Co., Waltham, Mass. In his new position, Hilton will help the company's various divisions and departments select, utilize and develop their key personnel. He was formerly consultant with the Psychological Corporation in New York City.

Pneumatic tools by

AIRETOOL

speed up production

Airetool's new line of portable pneumatic equipment is designed for fast, easy, more economical operation. Each tool is powered by Airetool's dependable pneumatic motor . . . the result of more than 27 years' experience in designing, developing and manufacturing pneumatic powered equipment.

Speed production and reduce operating costs by selecting your tools from the complete Airetool line.

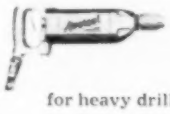
GRINDERS
Horizontal and vertical models up to 8" wheel capacity and full range of speeds. Also high-speed midget die grinders.

DRILLS
Complete range of small lightweight production models 3/16" to ¼" in all speeds. Also heavy duty ¾" capacity model.

for grinding

for sanding

for hand drilling



for heavy drilling

for die grinding

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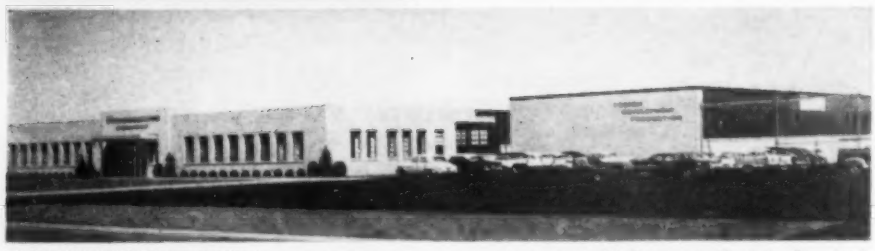

THE VISIONEERING COMPANY has moved into a large new plant at 11830 Brookpark Road in Cleveland. Formerly occupied by another firm, the plant has been enlarged by Visioneering to include 80,000 sq. ft. of manufacturing area, plus spacious administrative and engineering offices. A division of the Curtis Manufacturing Co. of Cleveland, the company has been actively engaged in various phases of the missile program, notably developing special magnesium cabinets for the housing of electronic devices.

W. J. Hennessy

R. A. Warfel

William J. Hennessy has been named National Product Development Manager for Kelite Corp., Berkeley Heights, N.J., manufacturer of industrial chemicals for cleaning and metal finishing, and steam cleaning equipment. Before serving in various capacities for Kelite, he was with Pennsalt Chemicals Co. for more than twenty years in various sales and sales management positions.

Robert A. Warfel has been named Vice-President and Works Manager of Nelco Tool Co., Inc., located at Manchester, Conn. The organization is the carbide manufacturing subsidiary of the Cutting Tool Division of Brown and Sharpe Mfg. Co. Warfel was previously Superintendent of New Product Development for the company, and prior to that, Division Superintendent of a large cutting tool manufacturer.

R. E. Fitzpatrick has been appointed District Sales Manager in Cleveland for the Fulton Sylphon Division, Robertshaw-Fulton Controls Co. The Cleveland sales headquarters is located at 1991 Lee Rd., Cleveland Heights, and serves upper Ohio, northern West Virginia and western Pennsylvania.

R. E. Fitzpatrick

C. E. Post

C. E. "Cliff" Post has been named Eastern Regional Sales Manager of the Tool and Wheel Division of American Coldset Corporation, Teterboro, N.J. He has been long associated with the organization.

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Specialists in Fine Abrasives

ABRASIVE POWDERS for METAL, GLASS, STONE and PLASTICS POLISHING and for FRICTION POWDERS

If your NEEDS are LARGE or SMALL

We offer a TRUE CUSTOM SERVICE in the MANUFACTURE of FINE and ULTRA-FINE ABRASIVE POWDERS

Now in manufacture, fused and unfused Aluminum Oxides—and more to come.

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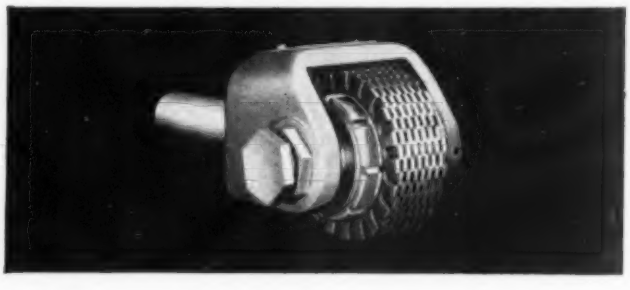
MICRO ABRASIVES CORPORATION
720 SOUTHAMPTON ROAD
WESTFIELD, MASSACHUSETTS

PRECISION DRESSER



Desmond precision ball bearing dressers can replace diamonds on surface, centerless, and machine grinders in many instances—at substantial savings. Where diamonds are required for extreme final truing, Desmond precision dressers still can be used for semi-finish dressing. Five models available, each with easily replaceable hardened tool steel cutters and dust-protected ball bearings. Ask your Desmond distributor or write direct for catalog and full information.

The only complete line of grinding wheel dressers and cutters

Desmond

THE DESMOND-STEPHAN MFG. CO., URBANA, OHIO

WALLS TU-WAY BELT SANDER

USE IT EITHER WAY

Full 1/3 h.p. G. E. Motor

At last, a top quality industrial sander that provides all the most wanted features — yet sells for so little.

complete with cord, plug, switch ready to use **$89.95**

Illustrated Literature on Request

A few desirable distributor territories still available.

WALLS SALES CORPORATION
333 Nassau Avenue Brooklyn 22, N. Y.

M. S. (Reece) Feltz has been named Marketing Manager of the Acro Div., Robertshaw-Fulton Controls Co., Columbus, Ohio. He joined the company in 1947 as a sales engineer.

B. T. Clarke

M. S. Feltz

Bruce T. Clarke has been named Divisional Sales Manager of The Pfaudler Co., a division of Pfaudler Permutit Inc. of Rochester, N.Y.

L. Rene Gaiennie has been elected Vice-President of Industrial and Public Relations of ACF Industries, Incorporated. He succeeds **Albert L. Kress**, who remains a staff Vice-President. Gaiennie came to the organization in September 1957 as Director of Industrial and Public Relations. His new duties will encompass labor relations, public relations, personnel, wage and salary administration, security, safety and employee benefits. Prior to joining ACF in 1955, Kress was engaged as a management consultant.

BETTER CUT WITH
BEAVER CUT CARBIDE

Cushion Ground and Micro-Lapped Rotary Files, Grinding Burrs, and Center Lapping Tools outlast regular ground carbide tools by 30% yet cost no more.

You may make a greater saving by sending us your dull tools for sharpening by our manufacturing method.

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A FLUID POWER TRAINING PROGRAM
to fill industry's need for trained personnel

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An up-to-date practical course of study covering Theory, Fundamentals of operation, Application, Diagnosis and Repair for all types of hydraulic and pneumatic equipment and controls.

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Investigate **the advantages of Hitchcock's FLUID POWER home-study course for training individuals to fill your fluid power personnel needs. You'll benefit through increased production and operating efficiency. Send for complete information and enrollment forms today !**

HITCHCOCK Publishing Company / Dept. of Training & Education, Industrial Services Division, 222 E. WILLOW AVE., WHEATON, ILLINOIS

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.0002 T.I.R. or less at Spindle Nose, .0005 T.I.R. or less on Test Arbor six inches from Spindle Nose

SPINDLE SPEEDS 150 and 250 RPM Other Spindle Speed Pulleys Available

MODEL B943 MOTOR DRIVEN WORK HEAD

No. 11 B & S Tapered Spindle Standard Equipment. No. 12 B & S or No. 5 Morse Available at Slight Extra Cost.

Clip ad to your letterhead and send for Literature

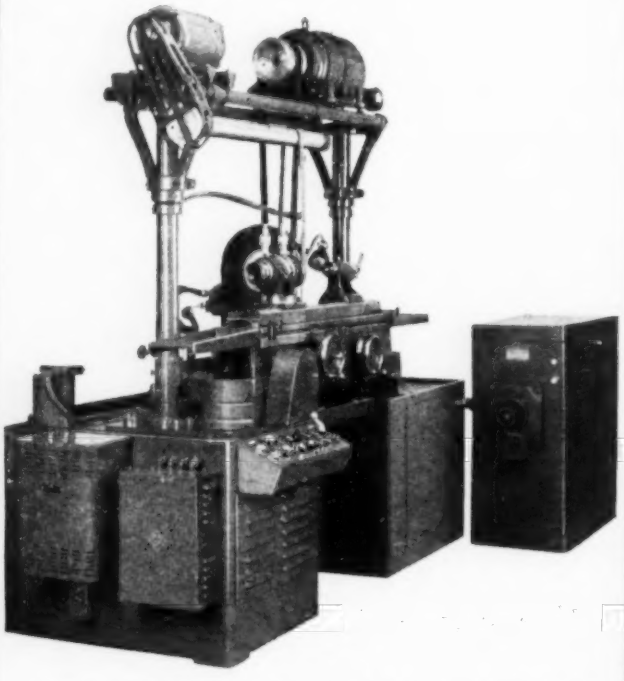
K. O. Lee Company, Aberdeen, S. D.

WHY AN OVERHEAD DRIVE?

When purchasing a Grinder you want roundness from .000005 to .000020, a finish from One to Five R.M.S. with immediate spark-out for fast production and ability to hold size from .0001 to .000010.

In order to accomplish this CRYSTAL LAKE uses double taper cone bearings that are pulled into solid bronze boxes.

CRYSTAL LAKE introduced their One R.M.S. Grinder in 1936 featuring their separate motor drive, eliminating cinewave and providing ample power as a motor larger than wheel head can be used. To produce a One R.M.S. a heavy oil drag has to be placed on bearings. When a spindle is round and held tight in solid boxes, sizing is easy. Spindle, if necessary, can be stopped for measuring of small work, as motor recoil is taken up by springs on hinged motor plate.



As an example of the advantages of the overhead drive, we use our No. 1018 Universal Grinder which is equipped with a 2 horse power motor mounted overhead driving the wheel head spindle ninety degrees from grinding wheel pressure which keeps the bearings round and doubles their life. A one horse power drag is placed on a 2⅛" Diameter spindle so wheel will have to cut round. Bearings can be adjusted from time to time by using Dial Indicator to set end play.

Along with the two horse power on the Wheel Spindle a ¾ h.p. Speedranger is used on the Headstock so a ½ h.p. drag can be placed on double taper headstock bearings. Headstock will grind round from .000005" up.

Table can be moved easily as several hundred pounds are taken off table by this mounting.

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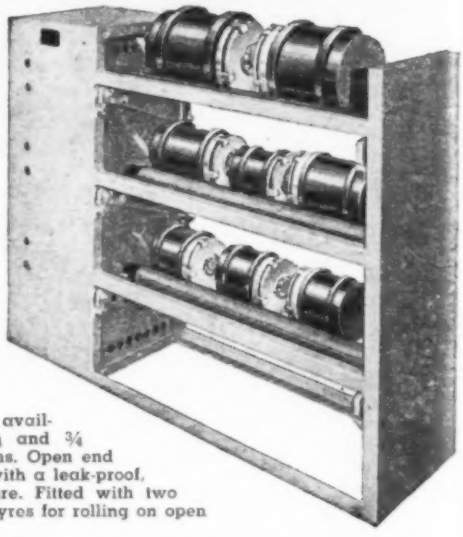

Here is a new type of barrel for de-burring, descaling and burnishing small parts in small batches. The barrels are made of rubber-resin in chemical combination, a material with the excellent properties of toughness with lightness and resistance to wear and corrosion.

The barrel sizes available are 2½, 1¼ and ¾ nominal U.S. gallons. Open end of barrels sealed with a leak-proof, quick-release closure. Fitted with two solid rubber-resin tyres for rolling on open rolls.

The barrel finisher shown consists of three sets of rolls arranged in three tiers, each set consisting of a driven roll and an idler roll. Each tier driven by a separate motor or, if required all three can be driven by one motor. The idler roll is adjustable to take the different barrel diameters and various combinations of barrel sizes can be rolled at the same time such as six 2½-gallon or two 2½-gallon and four 1¼-gallon or six 1¼-gallon or nine ½-gallon.

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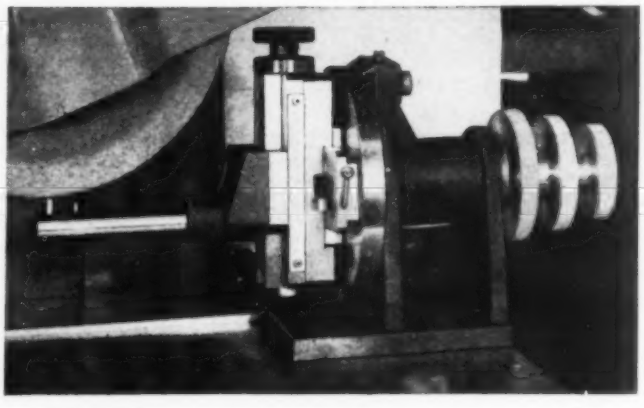

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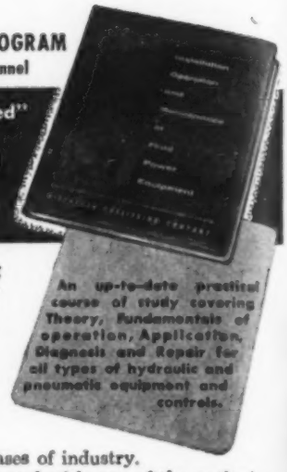
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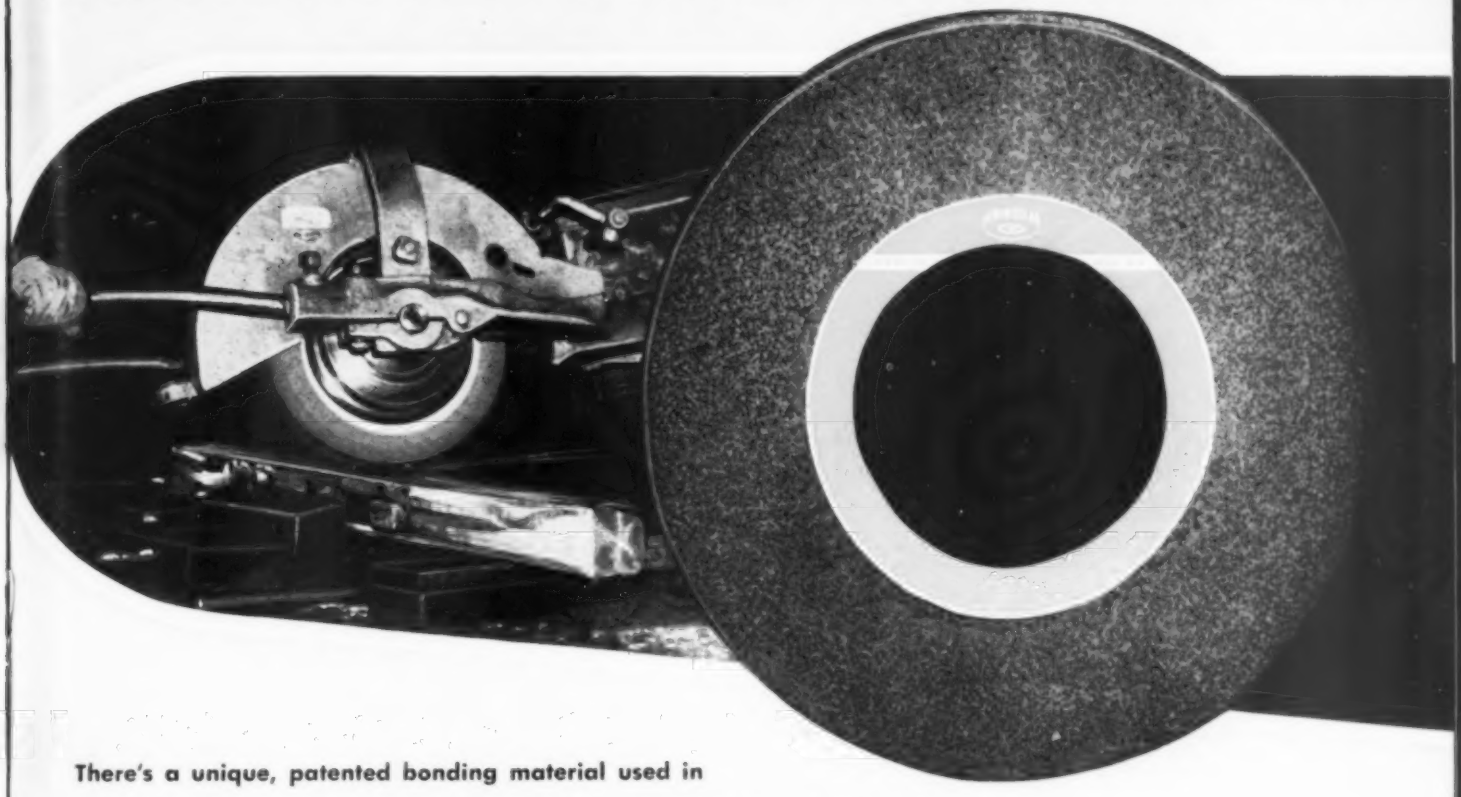

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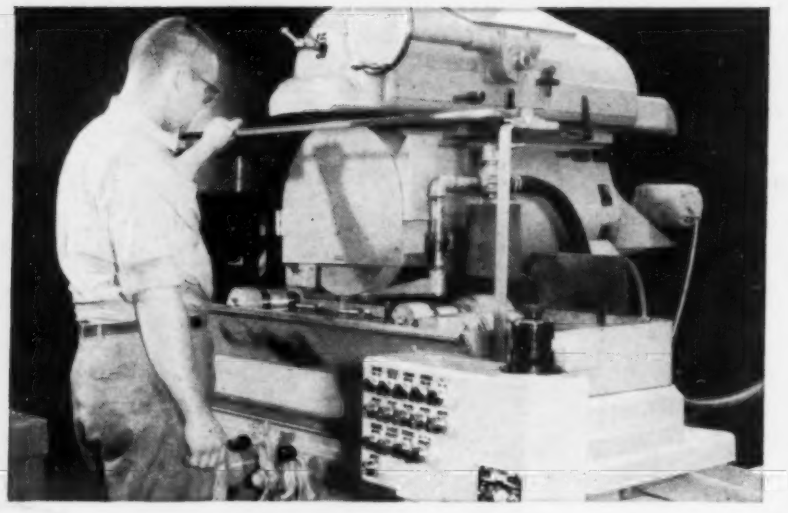

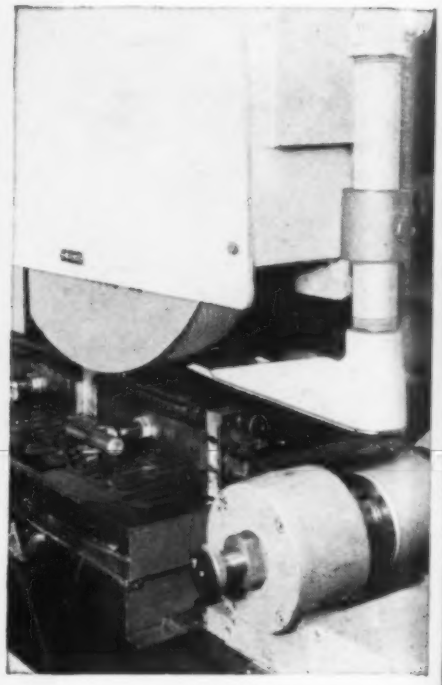

In the production of ledger plates, used in the cutter bar of mowing machines, The Oliver Corp. of Chicago, formerly first milled the teeth, then hardened the plate. The hardening process caused distortion and variance in uniformity which impaired the cutting action of the bar.

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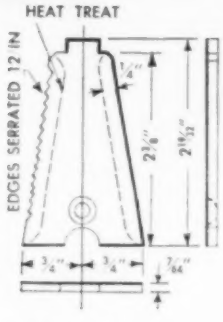
**Automatic machine cycle allows operator time to countersink hole in plate—an operation formerly requiring one man's full time.*



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